



Welcome

Kirby Road Extension

Environmental Assessment Study

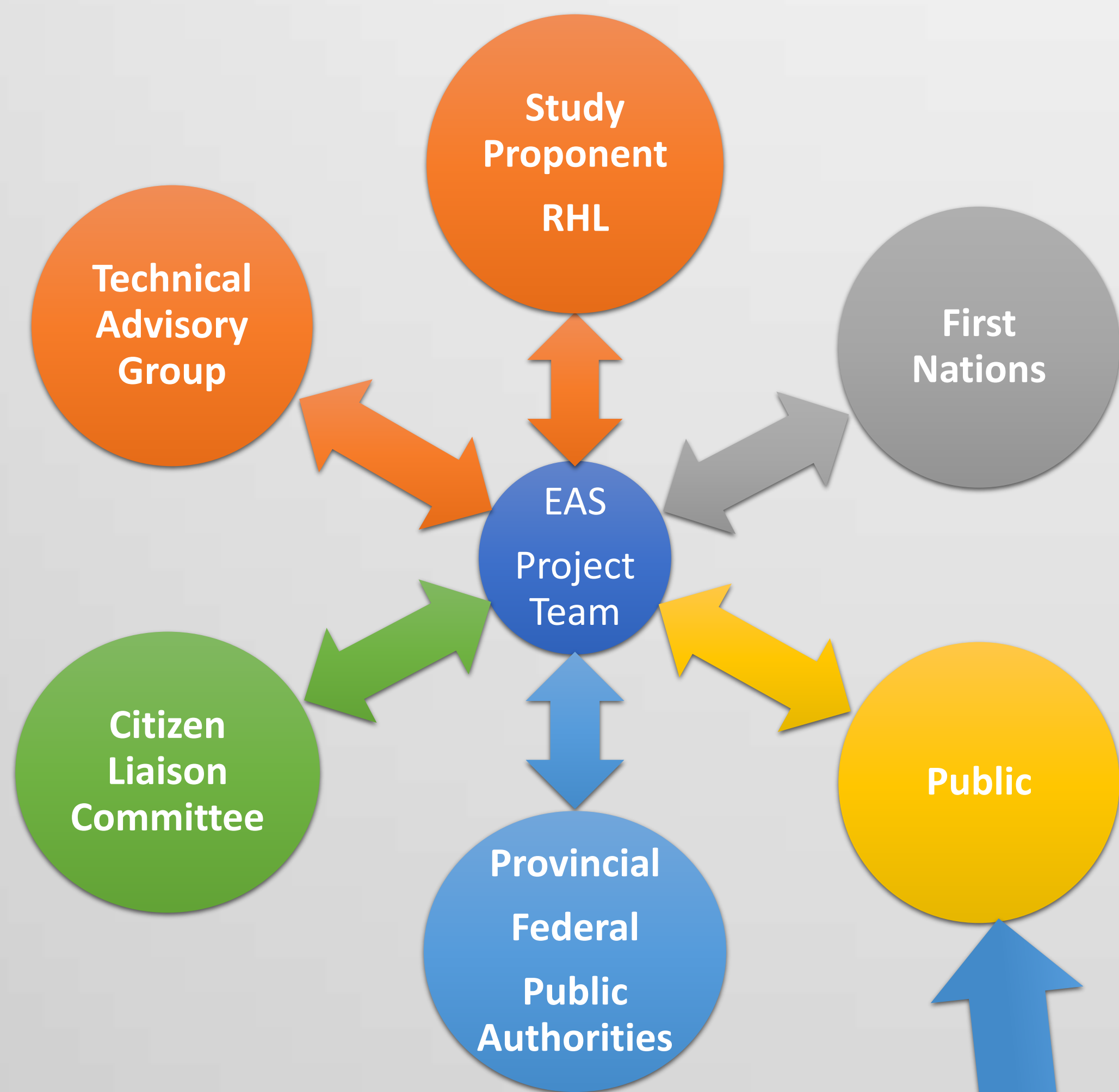
Public Information Centre #2

Vaughan Civic Centre Resource Library

June 28, 2018



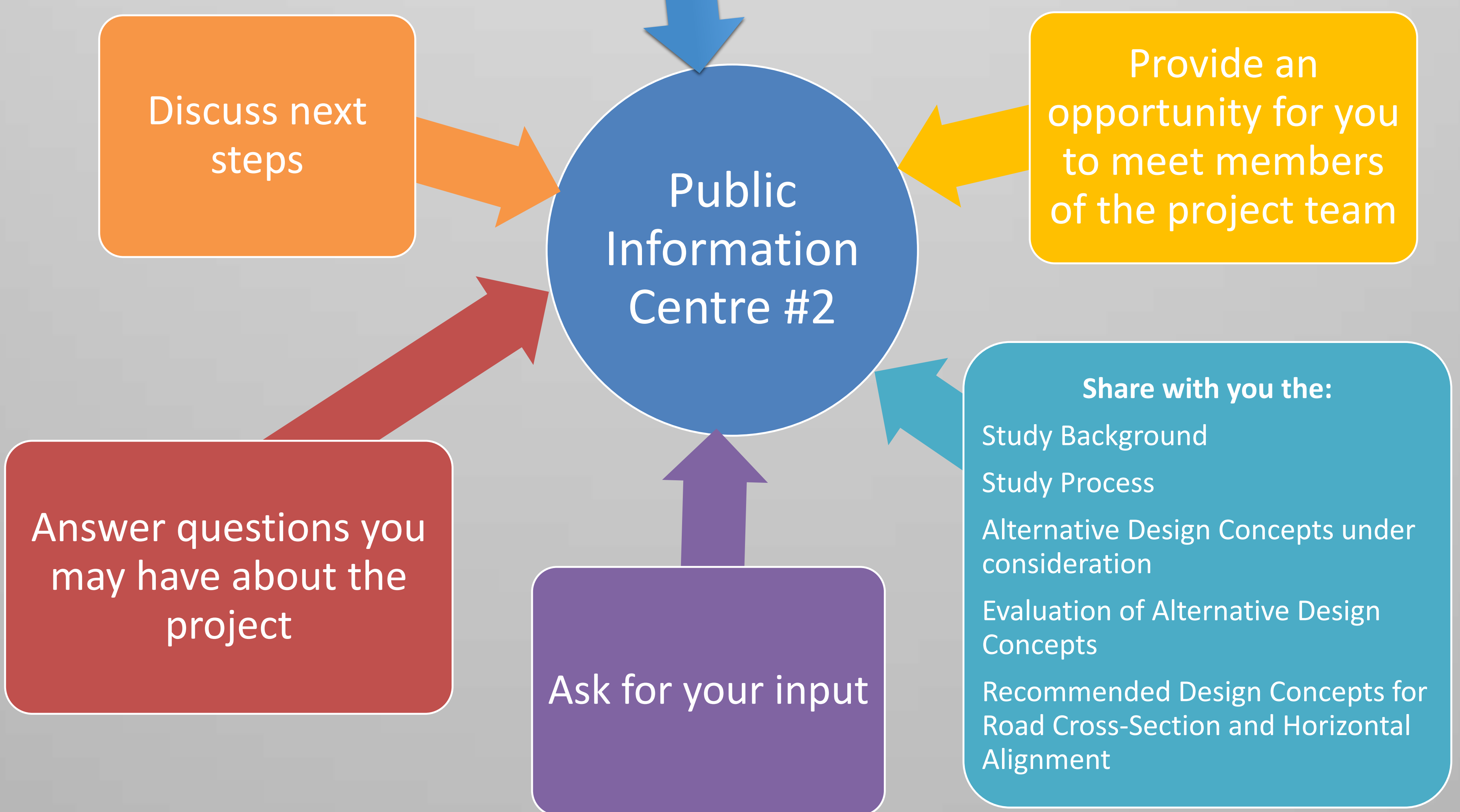
Why are we here?



Consultation early in and throughout the process is a key feature of environmental assessment planning.

Consultation Objectives

- ❑ Establish two-way communication between the study proponent and interested stakeholders to influence decision making and to provide opportunities for information exchange.
- ❑ Foster public trust and confidence by demonstrating that RHL is following a comprehensive consultation and sound decision making processes.



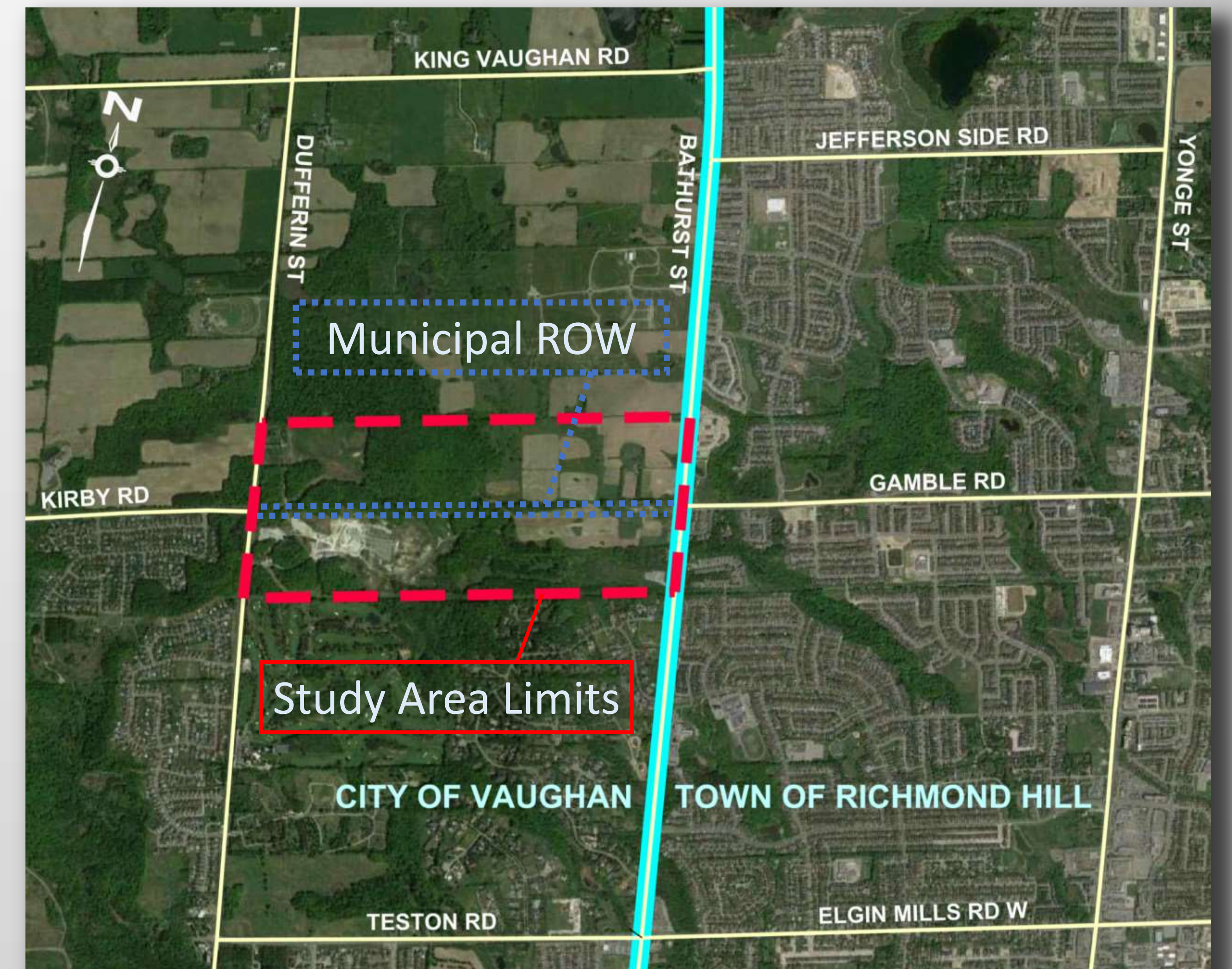
Completed public and project stakeholders consultation steps:

- Notice of Study Commencement May 2017
- TAG #1 Meeting June 2017
- CLC #1 Meeting June 2017
- Notice of PIC#1 June 2017
- PIC #1 June 2017
- Site walk with technical review agencies in August 2017
- TAG #2 June 2018
- CLC #2 June 2018
- Notice of PIC #2 June 2018

Current mailing list includes 94 stakeholders , 12 First Nations (FN) and Metis Nation of Ontario.

What is the study about ?

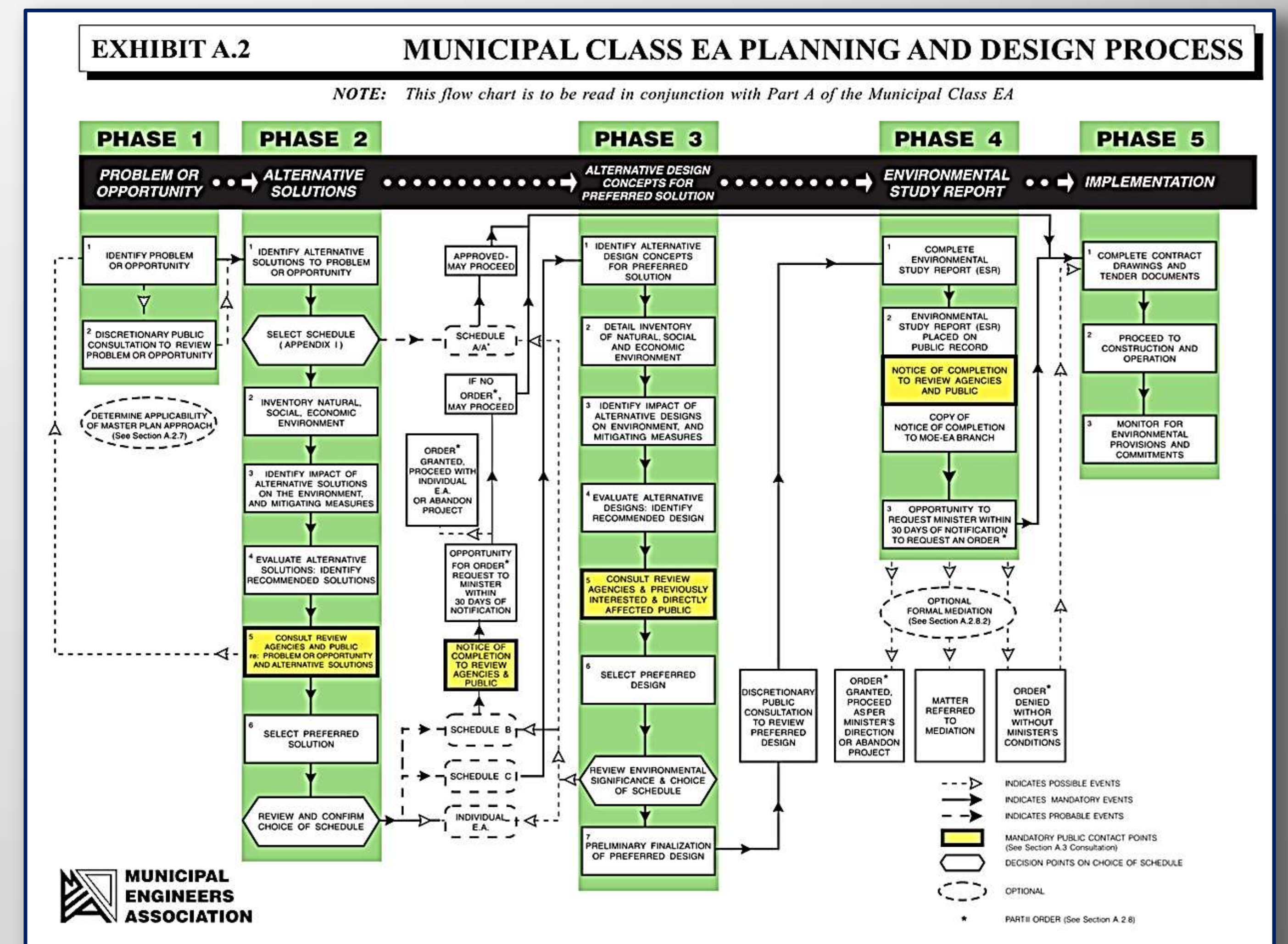
- ❑ **Environmental Assessment (EA)** is a decision making process to promote good environmental assessment planning under Ontario Environmental Assessment Act (EA Act)(1990).
- ❑ **Environment** is applied broadly and includes the natural, social, cultural, built and economic components.
- ❑ Study Area is located immediately **west of municipal border of Town of Richmond Hill** within the City of Vaughan.
- ❑ **Kirby Road connection** between Dufferin Street and Bathurst Street is missing.
- ❑ **New road projects** involve the construction of an **approved surface for various modes of transportation** on an existing road allowance where **no road surface** previously existed or the **acquisition of a new Right-Of-Way (ROW)** and **constructing a road on a new road allowance**, which is separate from an existing ROW.
- ❑ Kirby Road is presently under the jurisdiction of the City of Vaughan. The Region of York indicates that Kirby Road will take on a more Regional role and is a candidate to be added to the Regional road network under the Region's jurisdiction.
- ❑ The existing road allowance is 20.10m wide ROW. The **minimum required ROW for a new road is 36.0m**. The required width may increase through certain areas of the study to accommodate transit (bus bays, stops, shelters, etc.). The total length of the unopened road allowance is about 2 km.



- ❑ The purpose of the EA Act is “... the betterment of the people of the whole or any part of Ontario by the protection, conservation and wise management in Ontario of the environment...”

What is the study about?

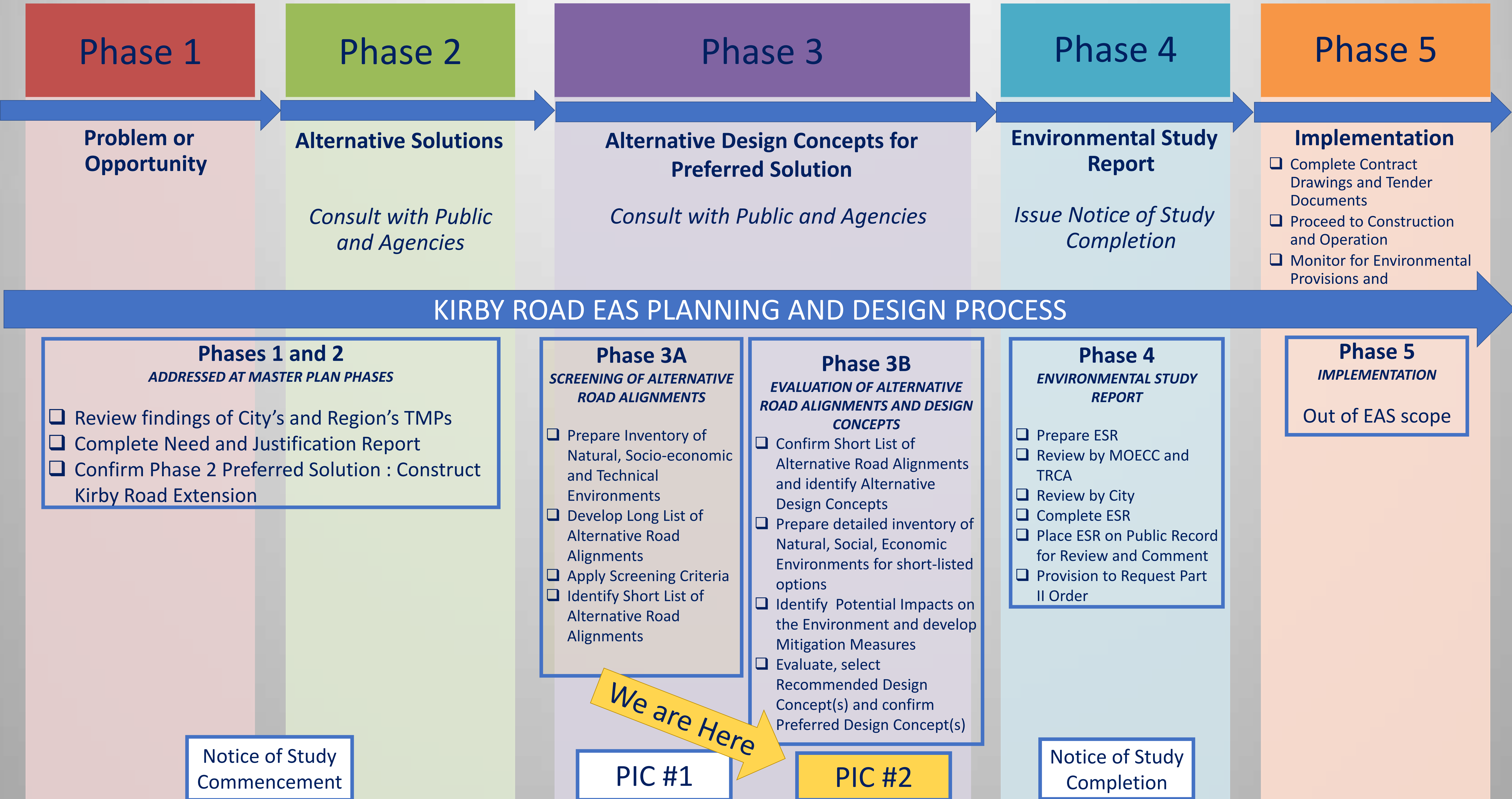
- ❑ Rizmi Holdings Limited (RHL) has been authorized by the City of Vaughan to undertake the necessary Environmental Assessment Study (EAS) to establish the preferred alignment and design for the extension of Kirby Road between Dufferin Street and Bathurst Street.
- ❑ The EAS is being planned as a **Schedule 'C' Municipal Road Project** in accordance with the Municipal Engineers Association (MEA) Municipal Class Environmental Assessment (MCEA) Document (2000, as amended).
- ❑ The **Class EA** is a planning and design process defined under Ontario EA Act for a group or "Class" of projects.
- ❑ The **Municipal Class EA** is an approved process which applies to a group of municipal infrastructure projects including roads, water, wastewater and transit.
- ❑ In the MEA MCEA Document, projects are categorised into four Schedules (A, A+, B, C) given the nature of the project, its complexity and magnitude of anticipated environmental effects.
- ❑ The Municipal Class EA provides a **framework for the EAS planning**. This is a **self-assessment process** where the responsibility for the process and compliance with its requirements rests with the study proponent. Subject to compliance with the Municipal Class EA, the new road project is deemed to fulfill the requirements of the EA Act.
- ❑ **New road** projects which have high **potential for significant effects** on the environment must **follow the Schedule 'C'** planning procedure outlined in the MEA MCEA Document.
- ❑ **Phases 1 and 2** of the Municipal Class EA have been **completed and addressed** in the **2013 City of Vaughan Transportation Master Plan (TMP)** and **2016 York Region TMP**.



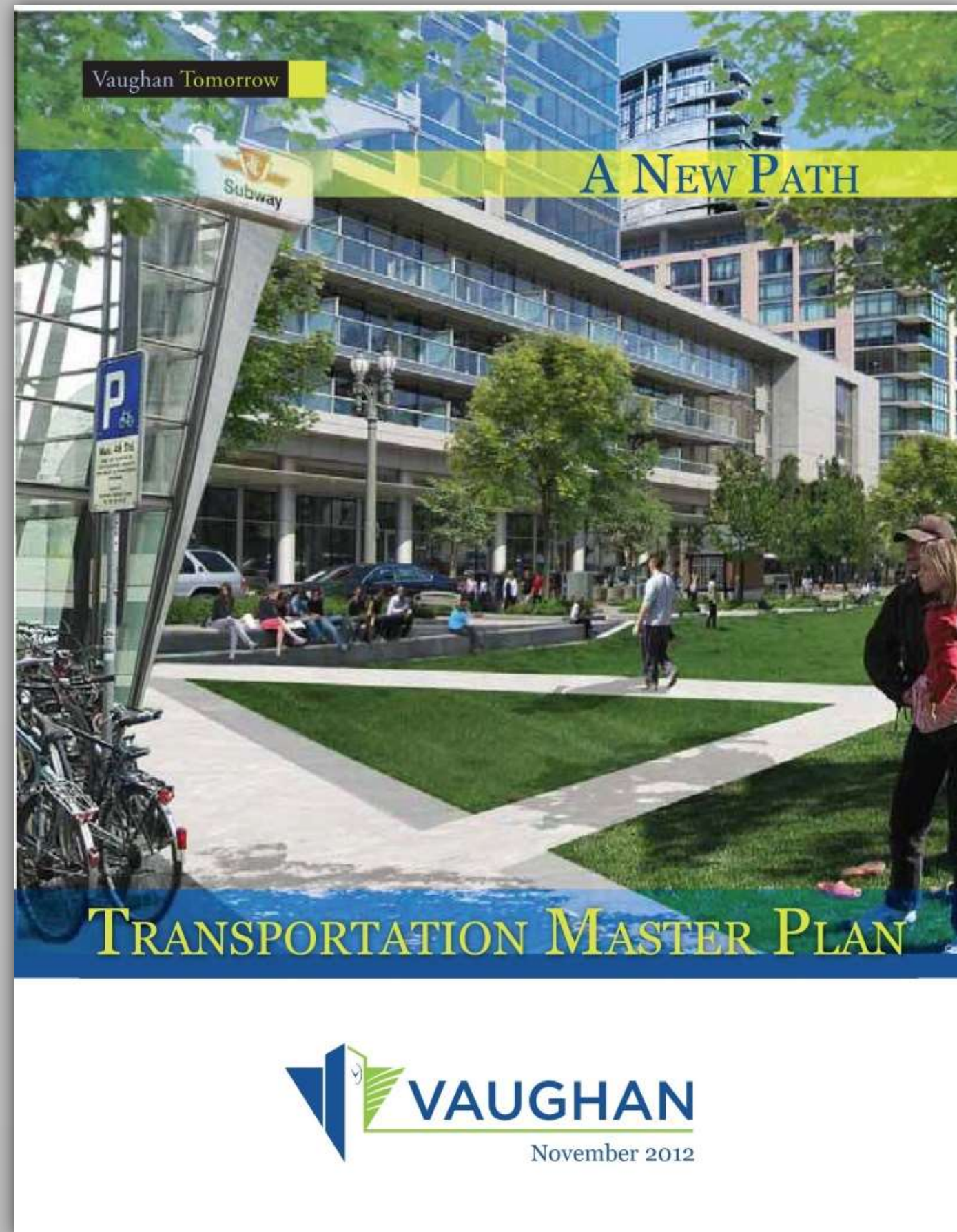
- ❑ As part of this EAS, **Phases 1 and 2** of the Municipal Class EA have been **revisited** and **Phases 3 and 4** are **being completed** by the **RHL, a private sector developer acting as the study Proponent**.
- ❑ The EAS considers and evaluates Alternative Design Concept(s) for the new roadway. It will identify a Preferred Design Concept(s) and complete an **Environmental Study Report (ESR)**.
- ❑ The **ESR will be provided to the City of Vaughan**, who will determine whether or not to issue a Notice of Study Completion as a Study **co-Proponent** and file the ESR for mandatory public review.

What is the Municipal Class EA Process ?

Overview of how the Kirby Road Extension EAS process follows the Municipal Class EA process is presented on the chart below.

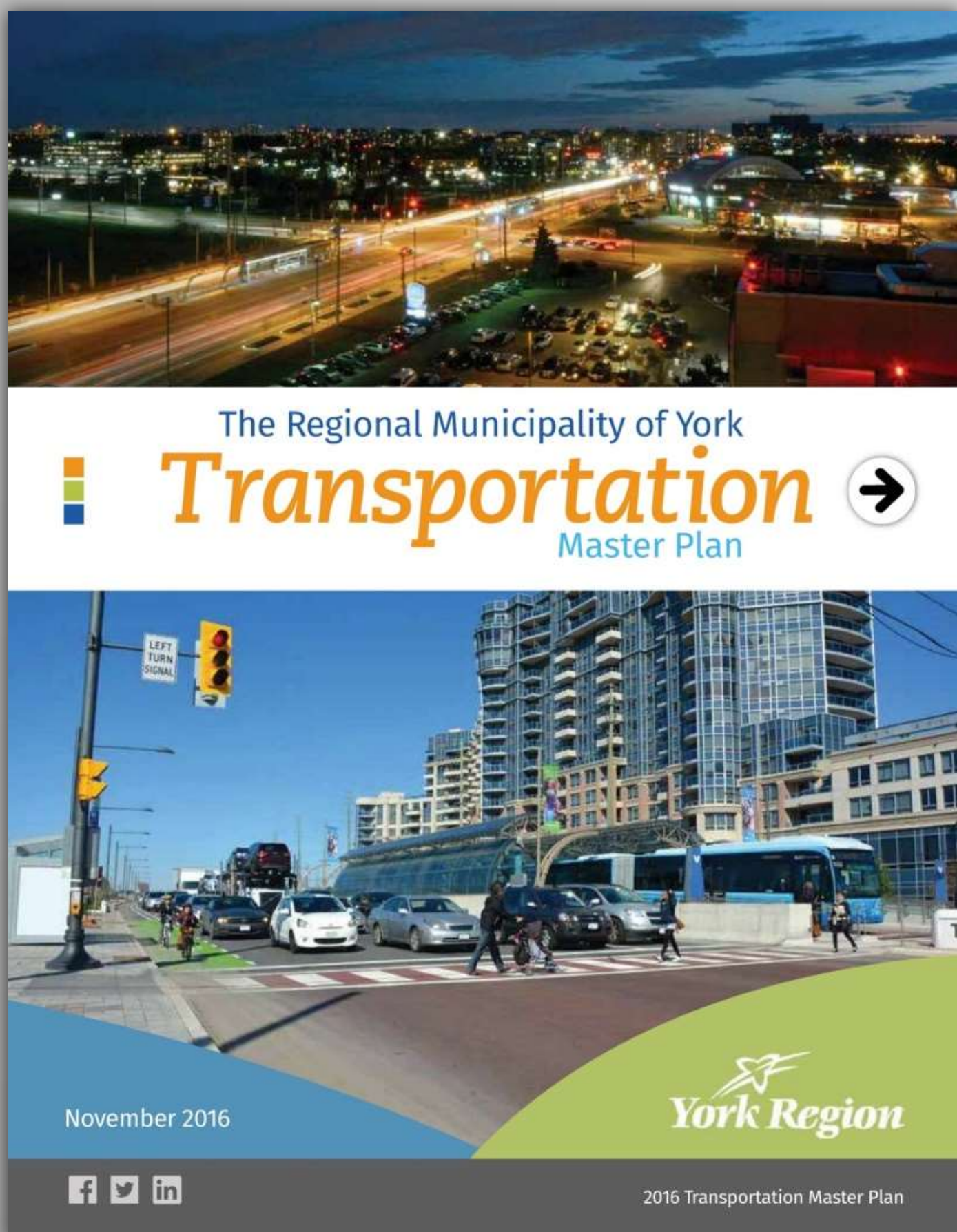


Why is this project needed ?



2013 City of Vaughan TMP identified the need for Kirby Road corridor improvements and confirmed the requirements for a new 4-lane roadway between Bathurst and Dufferin Streets, roadway widening to 4 lanes between Dufferin and Keele Streets and railway grade separation west of Keele Street.

Justification: “These are strategic road improvements needed to enhance network connectivity and the effectiveness of existing network, including for pedestrian and cycling modes. Corridor deficiency analysis indicates that the Kirby Road corridor will be approaching capacity and will need to be improved given its proximity to the urbanized area and its potential to serve east-west travel oriented to the future Highway 400 North employment area.”

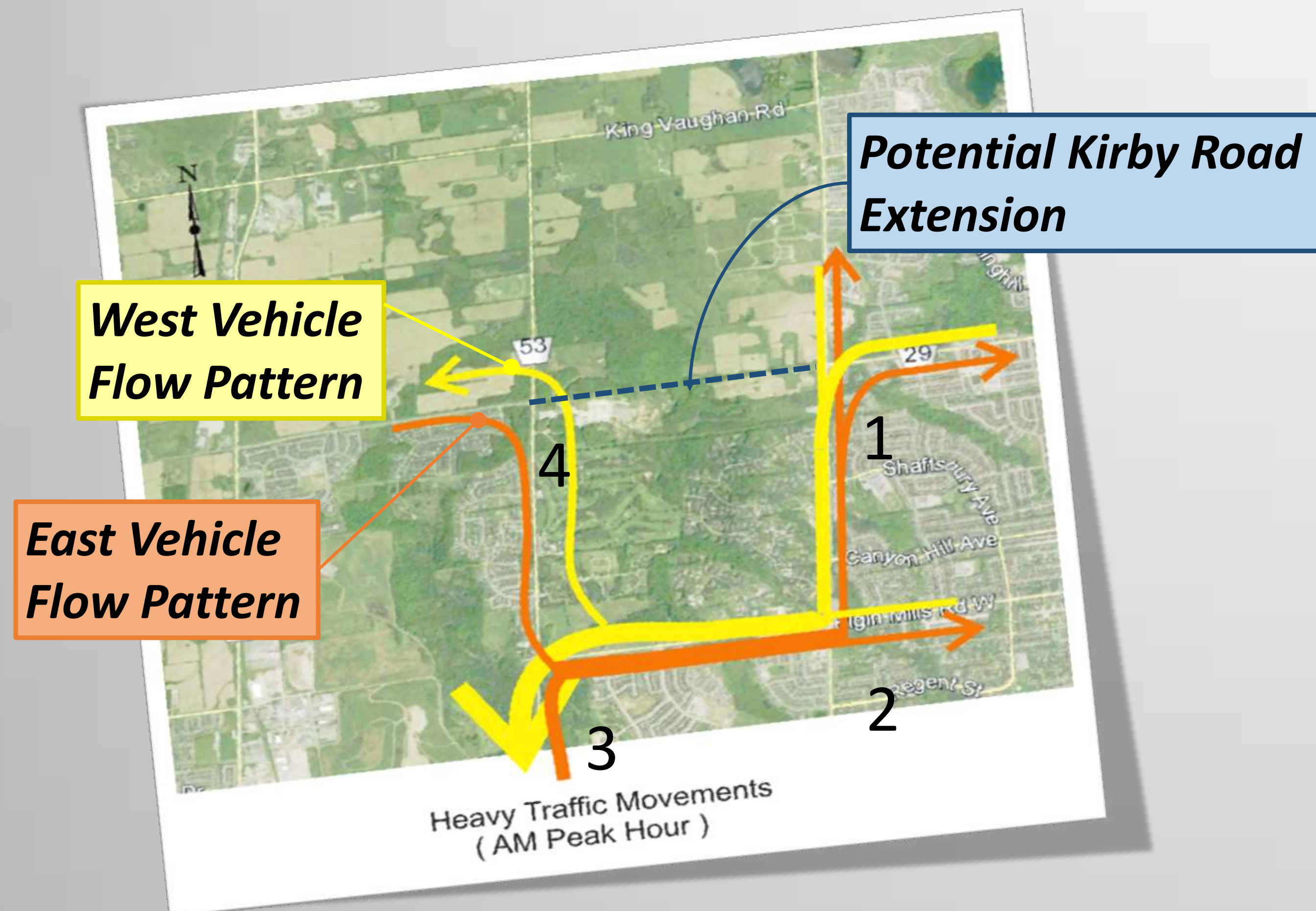


2016 York Region TMP identified the need for Kirby Road extension between Dufferin Street and Bathurst Street and confirmed the requirement to construct the 4-lane missing link.

Justification: “New road link serves approved development in North Vaughan and provides network connectivity. Corridor also supports goods movement as an Interim Primary Arterial for Goods Movement. Opportunity to improve walking and cycling facilities. Note: Currently under City of Vaughan jurisdiction but is a potential candidate for transfer to York Region. MNRF and TRCA have identified that this project is in an area with significant environmental sensitivities and the Region is committed to revisiting Phase 1 and Phase 2 of the Class EA as part of the next stage of the EA.”

Why is this project needed ?

Example of traffic analysis conducted by the Project Team:

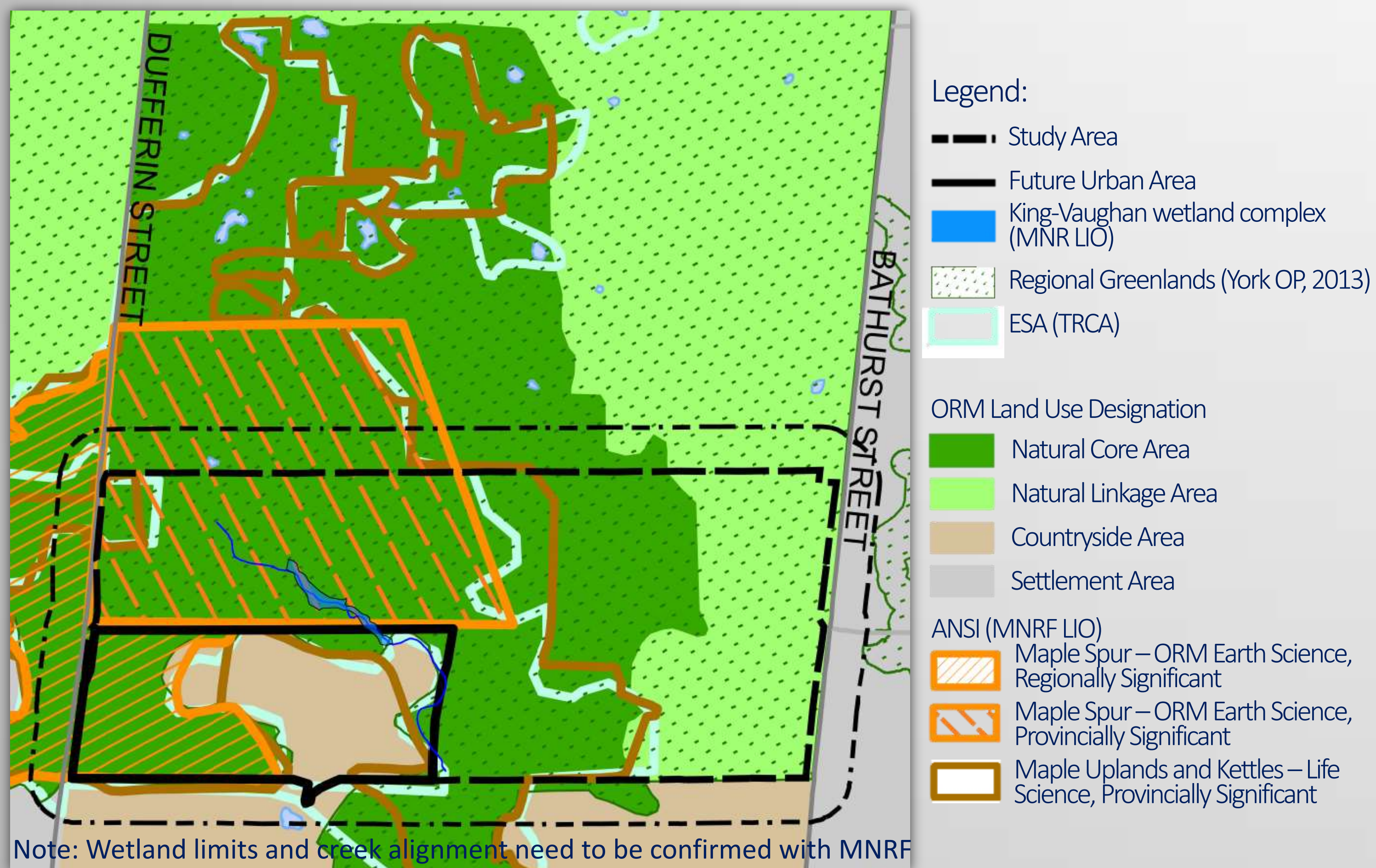


- Vehicle flow patterns from lack of Kirby Road extension is shown on left.
- Traffic counts conducted by both York Region and Poulos & Chung transportation consultants have been used for the analysis.
- High vehicle turning movements have been identified during typical weekday peak hours causing delays and congestion at all four of the primary intersections studied:
 1. Gamble Road at Bathurst Street
 2. Teston Road/Elgin Mills Road West at Bathurst Street
 3. Teston Road at Dufferin Street
 4. Kirby Road at Dufferin Street.

2017 Transportation, Traffic and Active Transportation Needs and Justification Assessment conducted by the Project Team:

- Revisited Phases 1 and 2 of Class EA process addressed through master planning by others
- Verified the need for Kirby Road Extension
- Concluded that Kirby Road should be connected between Dufferin Street and Bathurst Street by 2021
- Recommended that Kirby Road connection have two (2) lanes of traffic in each direction of travel
- Concluded that the four (4) lanes on this missing segment of Kirby Road are sufficient to meet the total traffic demands for 2031

What are the existing Natural Environment conditions?



The Natural Heritage designated areas include:

- ❑ The Oak Ridges Moraine Conservation Plan (ORMCP) area;
- ❑ The Maple Spur Oak Ridges Moraine Regionally Significant Earth Science Area of Natural and Scientific Interest (ANSI) - the wooded areas associated with the western portion of the Study Area;
- ❑ The Maple Spur Oak Ridges Moraine Provincially Significant Earth Science ANSI - the northern forested areas of the Study Area;
- ❑ The Maple Uplands and Kettles Provincially Significant Life Science ANSI – most of the wooded areas within the Study Area.
- ❑ The King-Vaughan Wetland Provincially Significant Wetland (PSW) Complex - Study Area includes one of the 23 wetland units mapped in this complex;
- ❑ The McGill Area Environmentally Sensitive Area (ESA) that is designated by Toronto and Region Conservation Authority (TRCA) and includes the King-Vaughan Wetland Complex, Maple Uplands and Kettle Wetlands Life Science ANSI, Cook’s Area Life Science ANSI and the Maple Spur of the Oak Ridges Moraine Earth Science ANSI; and
- ❑ Regional Greenlands as identified within the 2010 York Region Official Plan – the wooded areas within the Study Area.

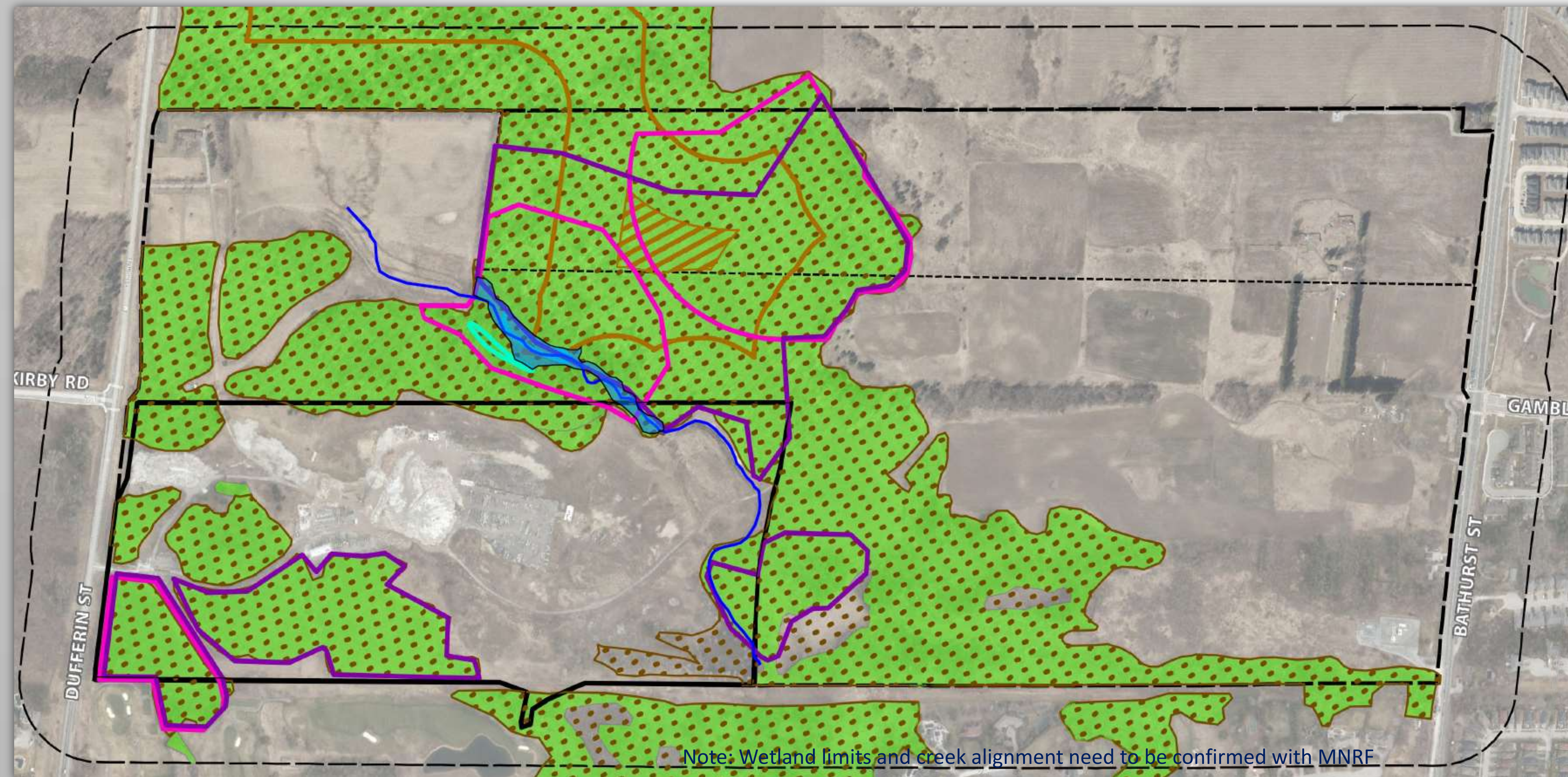
What did we study?

The results of Natural Heritage studies carried out from 2010 to 2017 provide:

- ❑ An inventory of existing conditions;
- ❑ An assessment of the significance and sensitivity of identified natural heritage features in accordance to definitions in the PPS, ORMCP, the ESA and Municipal (City of Vaughan) and Regional Official Plan policies (York Region); and
- ❑ The information used to evaluate the alternative designs for road cross-section and short list of road alignments.



What are the existing Natural Environment conditions?



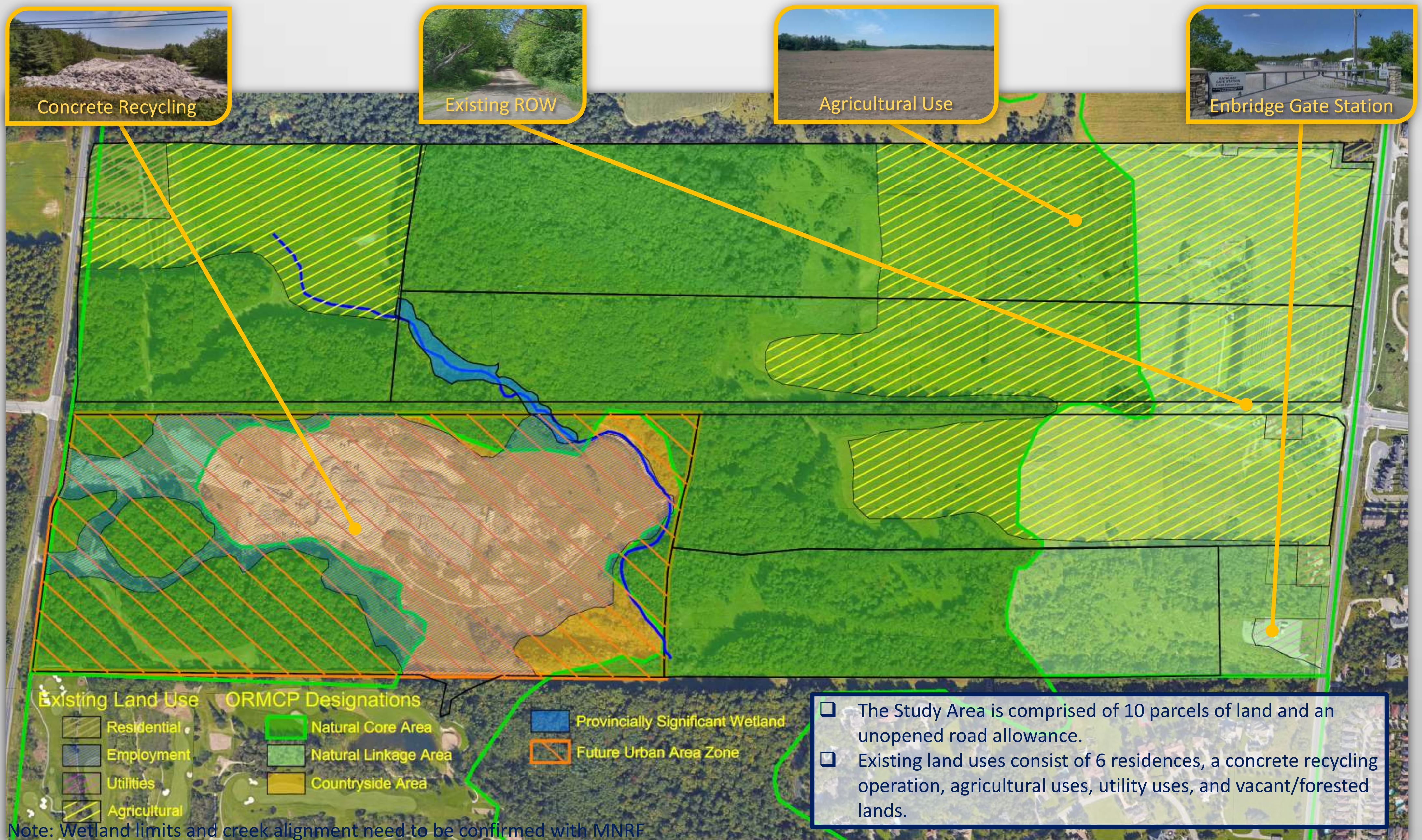
Legend:

- Future Urban Area Zone
- - - Subject Lands/Study Area
- - - 120m Adjacent Lands
- Significant Woodland (as Determined Through ORM Technical Paper 7)
- Interior Woodland 100 m
- Interior Woodland 200 m
- Bats Maternity Colonies SWH
- Seeps and Springs
- Eastern Wood-Pewee (Special Concern) SWH
- Wood Thrush (Special Concern) SWH

The Key Natural Heritage Features include:

- ❑ A tributary of Patterson Creek – drainage feature emanating from the King-Vaughan Wetland Complex and flowing towards the TransCanada Pipeline corridor running along the southern boundary of the Study Area (no direct or indirect fish habitat present)
- ❑ Groundwater discharge areas (seeps) along the north and south boundary of the Organic Thicket Swamp Ecosite and near the southern boundary of the Study Area
- ❑ Provincially Significant Wetland – defined as an organic thicket swamp ecosite (one unit of the King-Vaughan Wetland Provincially Significant Wetland Complex)
- ❑ Significant Woodlands
- ❑ Significant Wildlife Habitat for bird species of Conservation Concern and Bat Maternity Colony (SWH)
- ❑ Habitat for Species at Risk (Bats, Butternut and Bobolink).

Social Environment – Policies Overview



The provincial, regional and local planning policies were considered in the evaluation of Alternative Design Concepts:

2014 Provincial Policy Statement (PPS)

- ❑ Section 1.6.7.1 states: “Transportation systems should be provided which are safe, energy efficient, facilitate the movement of people and goods, and are appropriate to address projected needs.”
- ❑ Any road alignment traversing the Study Area in east-west direction will cross significant environmental features. While Section 2.1 of the PPS prohibits development and site alterations in significant environmental features, (i.e., a Provincially Significant Wetland), Section 6 Definitions of the PPS defines “development” to exclude “activities that create or maintain infrastructure authorized under an environmental assessment process”.
- ❑ The Study Area contains lands that have been identified as provincially significant Area of Natural and Scientific Interest (ANSI). The PPS only considers provincially significant ANSI as determined by the Ontario Ministry of Natural Resources and Forestry to be “significant”.

2017 Oak Ridges Moraine Conservation Plan (ORMCP)

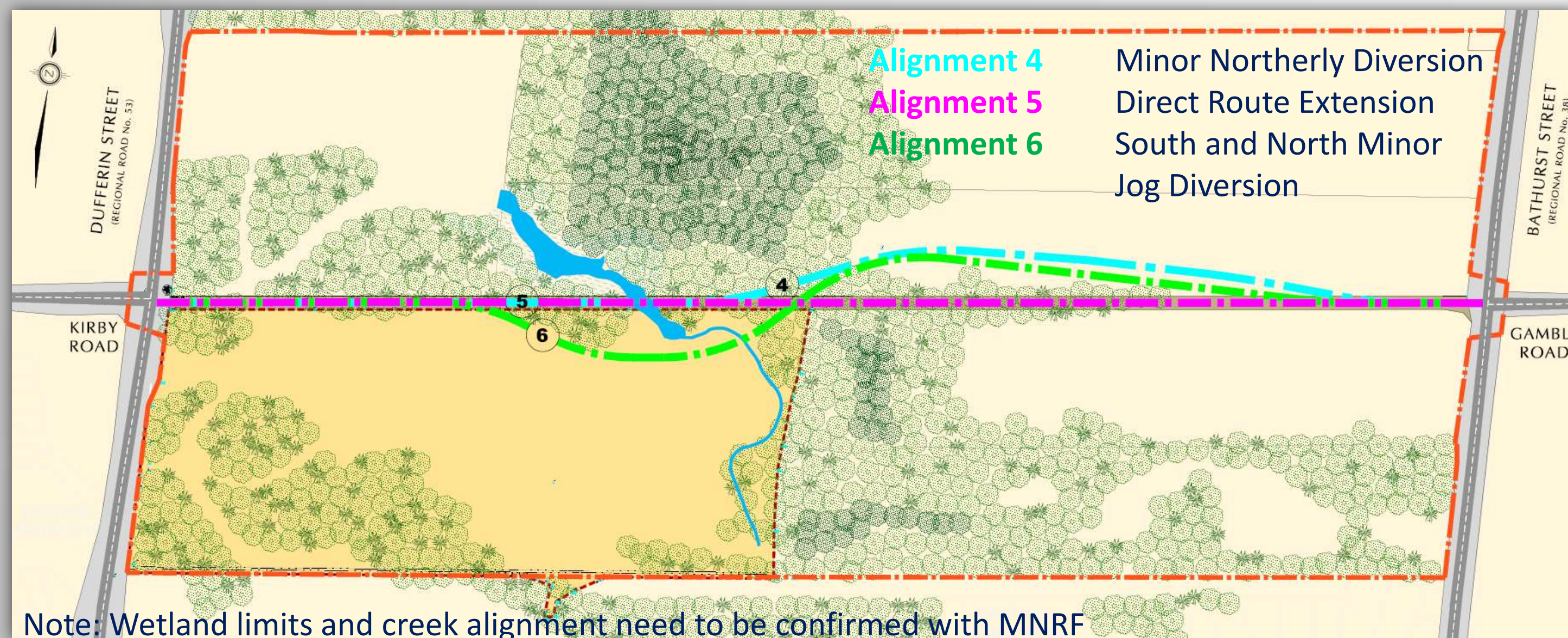
- ❑ Lands within the Study Area are designated Natural Core, Natural Linkage, and Countryside in the ORMCP. Infrastructure is only permitted in or on land in a Natural Core Area or Natural Linkage Area if there is a demonstrated need and there is no reasonable alternative. Both the York Region and City of Vaughan Master Transportation Plans confirmed the need to construct a 4-lane missing Kirby Road link. Transportation analysis conducted by the Project Team provided a consistent evaluation of alternatives and verified the need for the Kirby Road Extension.
- ❑ The ORMCP requires that the right of way width and construction disturbance be kept to a minimum, the project will allow for wildlife movement, lighting is focused downward and away from Natural Core Areas, and the project is located as close to the edge of the Natural Core Area as possible.
- ❑ The lands are also identified as Category 1 or Category 2 Landform Conservation Area. While Section 30 of the ORMCP serves to limit the impact of development and site alterations on existing landforms, the ORMCP defines “development” to exclude “activities that create or maintain infrastructure authorized under an environmental assessment process”.

2010 Region of York and City of Vaughan Official Plans

- ❑ Both the Region and the City incorporate the policies of the ORMCP in their Official Plans.
- ❑ Lands identified as Future Urban Area Zone in the southwest corner of the Study Area are subject to an order issued by the Minister of Municipal Affairs and Housing in February 2015.
- ❑ The Minister’s Order amends the Region of York Official Plan to indicate that these lands are intended to be developed for urban uses.
- ❑ The Minister’s Order amends the City of Vaughan Official Plan by designating the lands Low Density Residential and Valley and Stream Corridor. It also zones the property to Future Urban Area Zone permitting the development of Low Density Residential, Local Commercial, and Open Space uses.

What has happened since PIC# 1?

Short List of Alternative Road Alignments from PIC #1



Public Information Centre (PIC) #1 was held in June 2017. There was ongoing consultation with individual stakeholders, Review Agencies and First Nations. The project team provided written responses to comments received and posted study information on the project's web page.

Key concerns identified to date:

- Conformance with the Oak Ridges Moraine Conservation Plan
- Protection of Natural Heritage Features
- Location of unopened road allowance within Provincial, Municipal and TRCA Program and Policy Areas
- Road safety

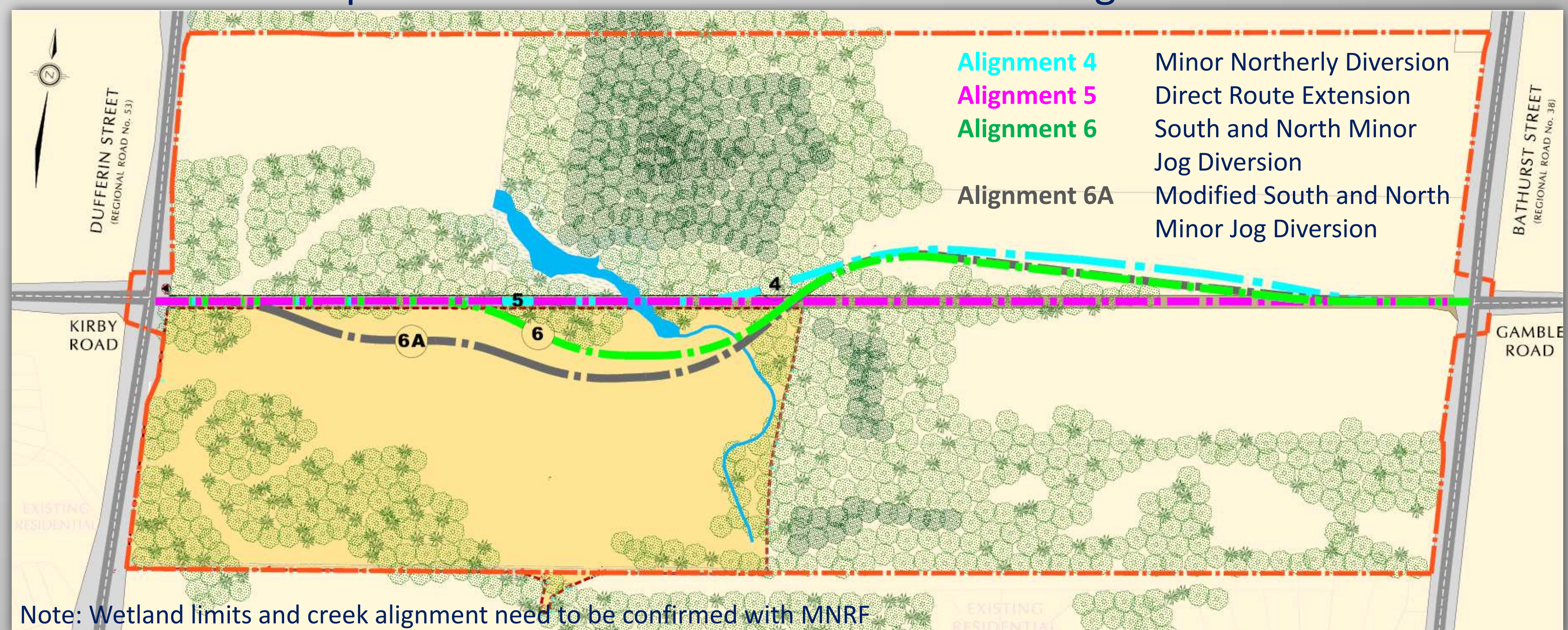
The three short-listed road alignments carried forward from PIC #1 for further evaluation are Alignments 4, 5 and 6. Based on the feedback received at the site walk with review agencies in late August 2017, the western segment of Alignment 6 has been modified to avoid environmental features. The additional route is identified as Alignment 6A. Also Alternative Design Concepts for road cross-sections have been developed at the request of the City of Vaughan.

The impact assessment of Alternative Design Concepts for road alignments and cross-sections is based on the detailed inventory of Transportation, Natural, Social and Economic Environments. The Project Team conducted additional studies with focus on the short-listed road alignments:

- Preliminary Geotechnical Investigation – February 2018
- Draft Hydrogeologic Study – March 2018
- Natural Heritage Existing Conditions Report – March 2018
- Socio-Economic Impact Assessment – April 2018
- Stage 1 Archaeological Assessment – April 2018
- Draft Update to Upper East Patterson Creek Geomorphic Assessment – May 2018
- Built Heritage Resources and Cultural Heritage Landscapes – Existing Conditions and Impact Assessment - June 2018

The conceptual design for the short-listed road alignments was advanced from single line to footprint presentation based on the identified environmental constraints and proposed mitigating measures.

Updated Short List of Alternative Road Alignments



How Alternative Design Concepts were evaluated?

Key Steps followed for Evaluation of Alternative Design Concepts

❑ Evaluation Criteria and Indicators

- Established Evaluation Criteria having in mind types of environment recommended by MEA MCEA for consideration by municipal road projects. Evaluation criteria were used to conduct a “Net Effects” analysis.
- Used Indicators to judge on degree of meeting the respective criterion.

❑ Net Effects Analysis

- Created an Evaluation matrix by grouping evaluation criteria and associated indicators under the key environmental Factors and related aspects helping to describe the existing environment.
- Identified remaining (net) effects on the environment after mitigation measures were applied.

❑ Comparative Evaluation

- Identified advantages and disadvantages for each Alternative Design Concept by comparing the “Net” effects associated with each concept to one another.
- Established rankings for each Alternative Design Concept.
 - Established normalized score for each Factor by averaging scores for each criterion
 - Established overall scores for each alternative by combining Factor specific scores

Ranking Symbol	Description	Ranking Score
	No Effect	5
	Minimal Effect	4
	Moderate Effect	3
	Significant Effect	2
	Very Significant Effect	1

- ❑ To ensure that visual presentation is accurate, design alternatives were scored by assigning a highest score of 5 points to the alternative that would create no impacts, and indexing the remaining alternatives against the recommended alternative for each environmental Factor
- ❑ To signify equal importance of all the Factors to the environment, no numerical weightings have been applied to the scores
- ❑ Alternative Design Concept(s) with the lowest overall impact, i.e. highest overall score have been identified as the Recommended Design Concept(s)

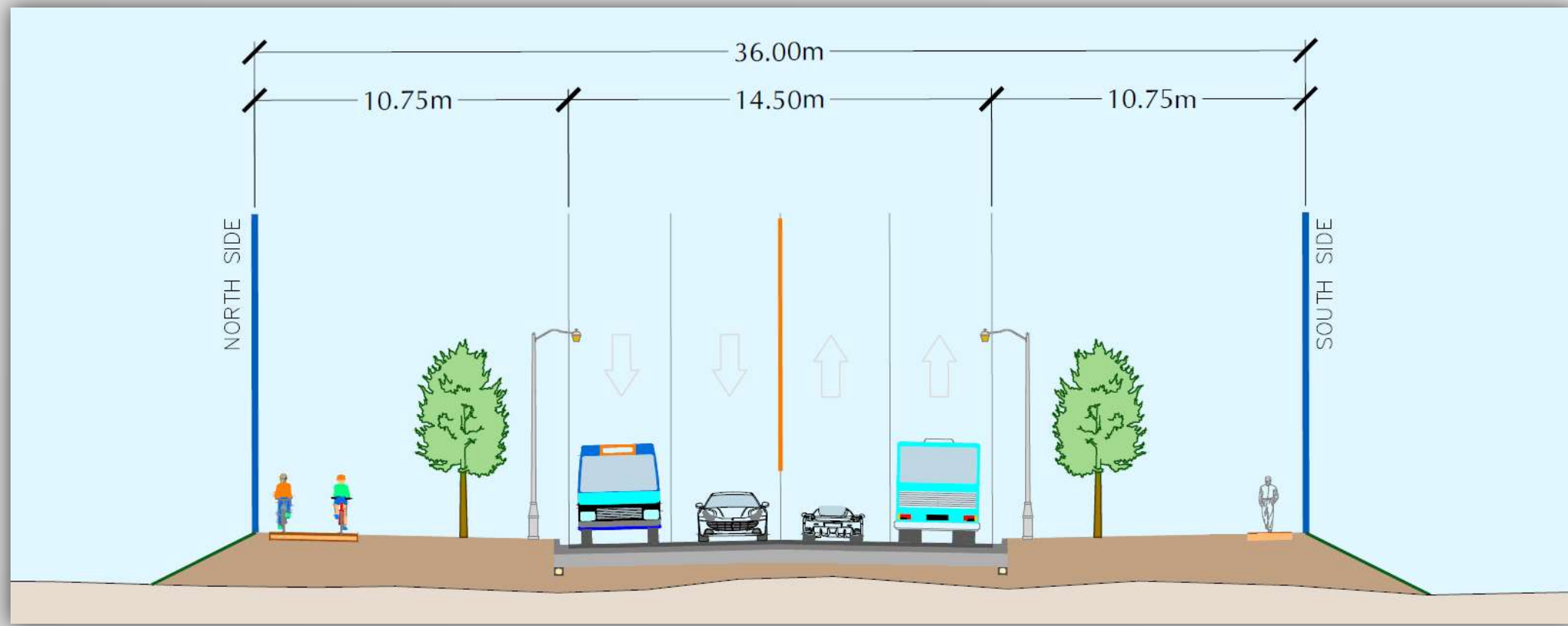
Overview of Alternative Road Cross-sections

Option 1

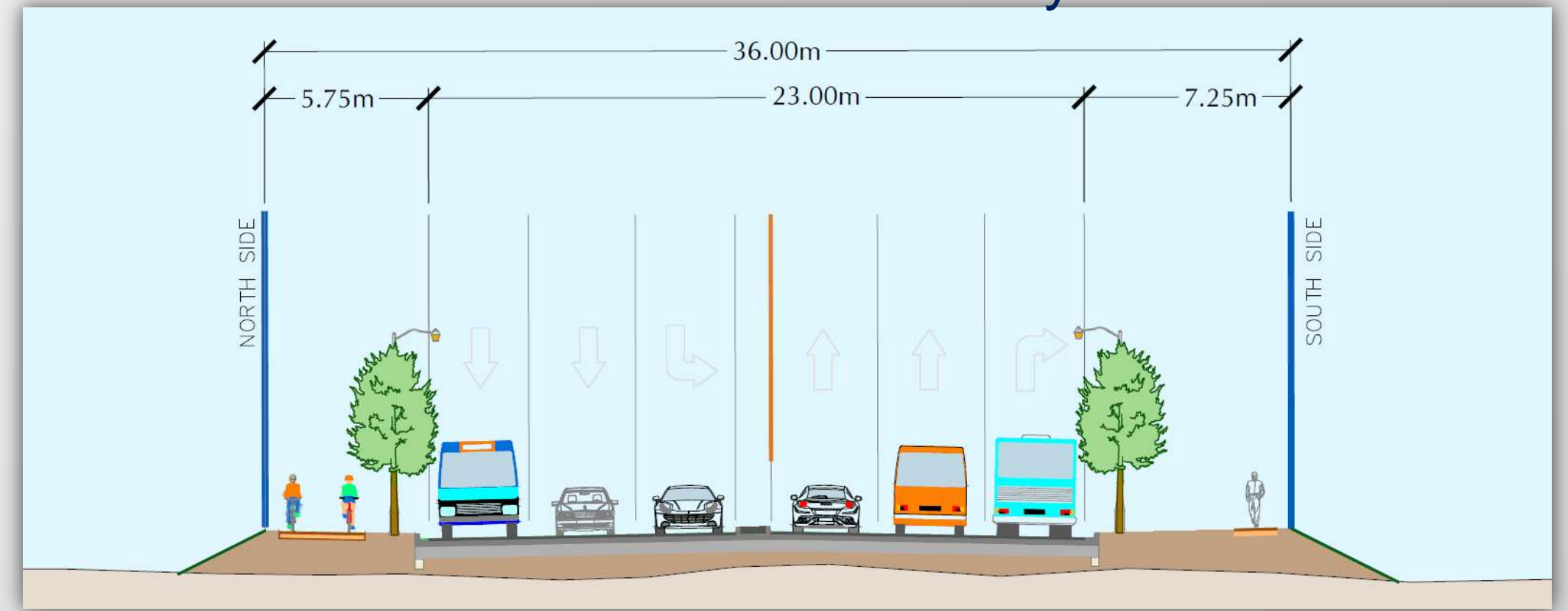
- 4 lane cross section
- Auxiliary lanes where required

- Sidewalk and multi-use trail
- 14.5m Pavement on 36m Right-Of-Way

Mid-block



Intersection with Auxiliary lanes

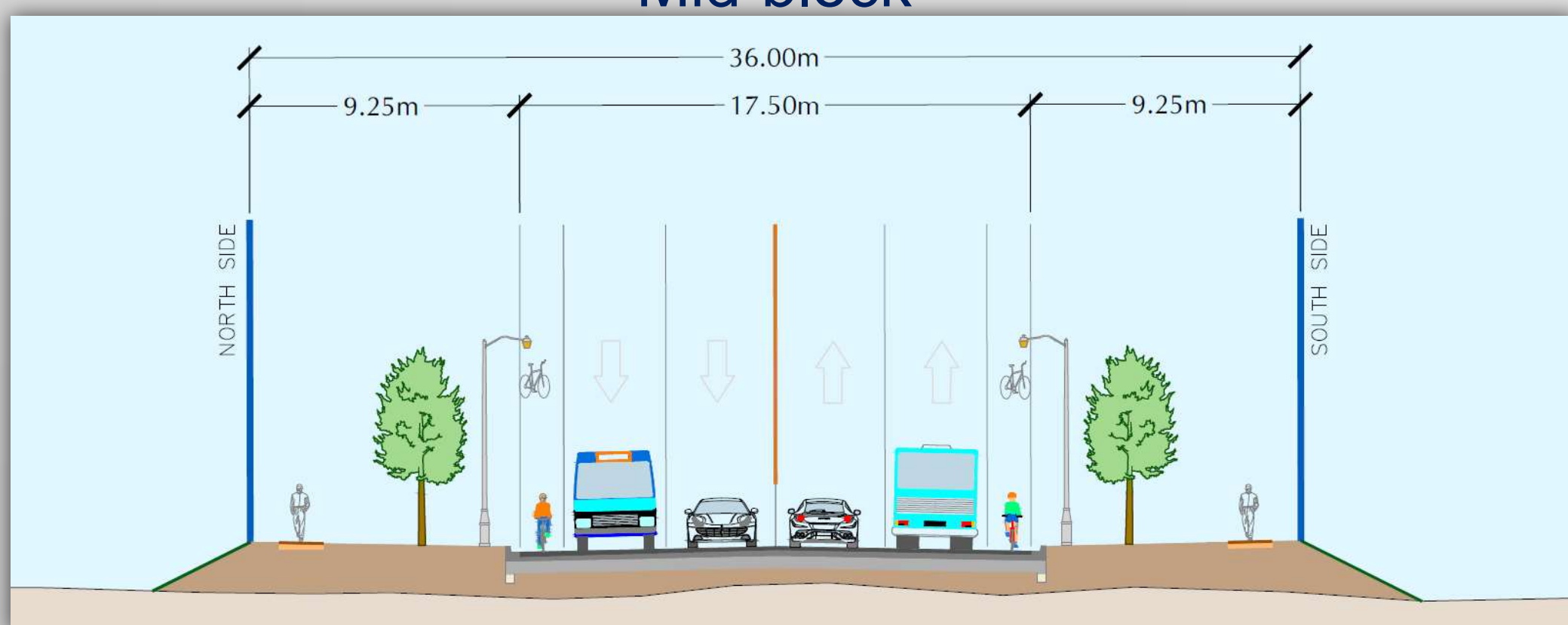


Option 2

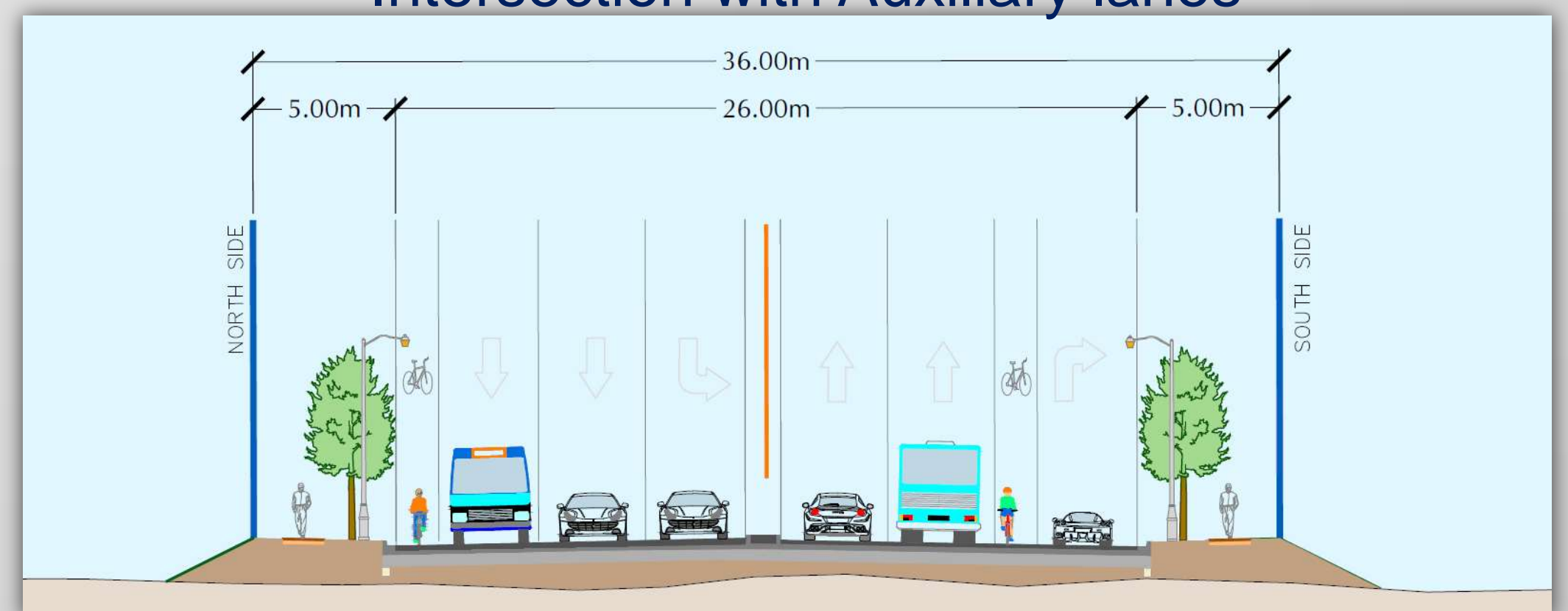
- 4 lane cross section
- Auxiliary lanes where required

- Sidewalks + dedicated bike lanes
- 17.5m pavement on 36m right-of-way

Mid-block



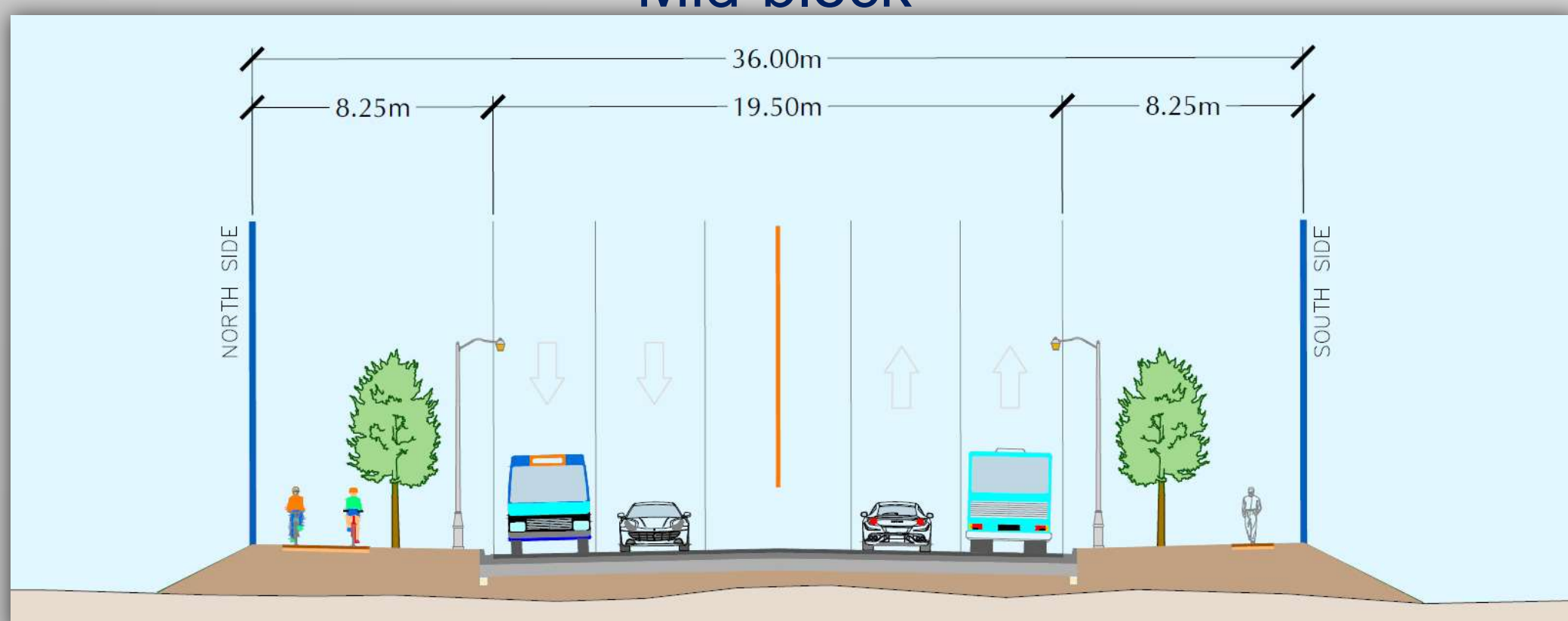
Intersection with Auxiliary lanes



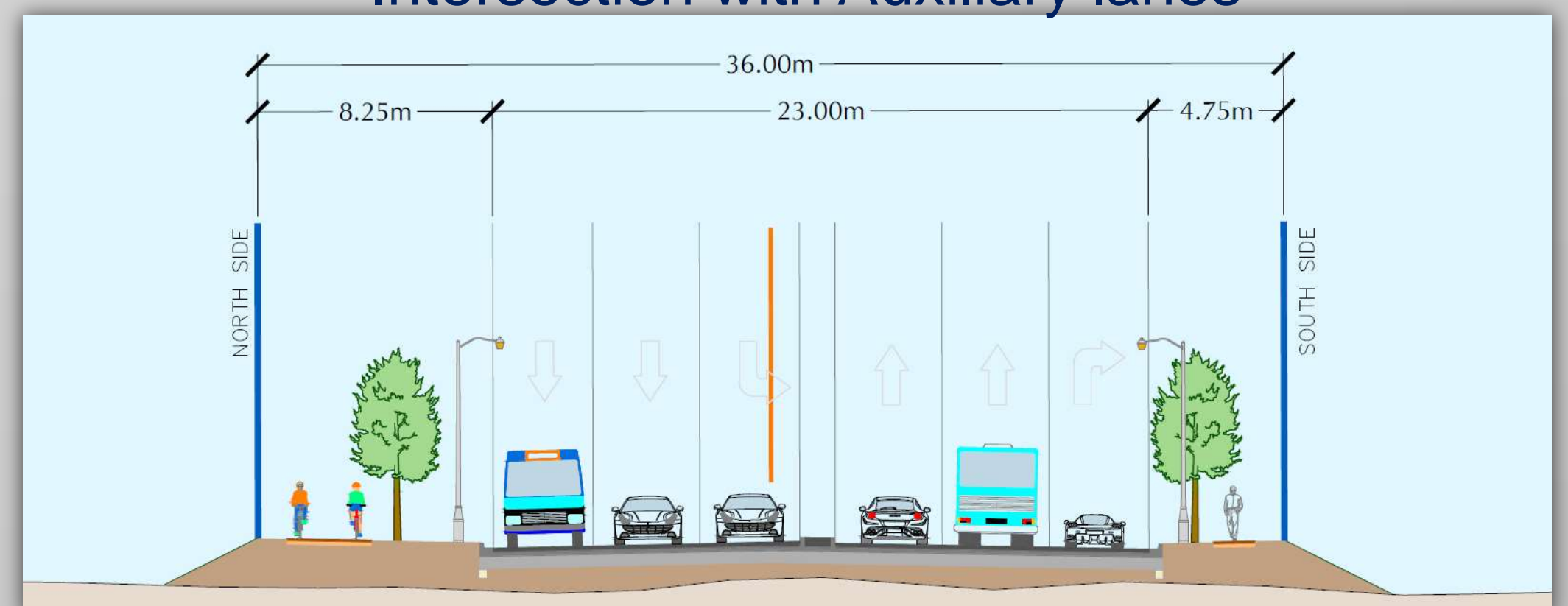
Option 3

- 5 lane cross section
- Continuous shared left + right turn lane
- Sidewalk and multi-use trail
- 19.5m pavement on 36m right-of-way

Mid-block



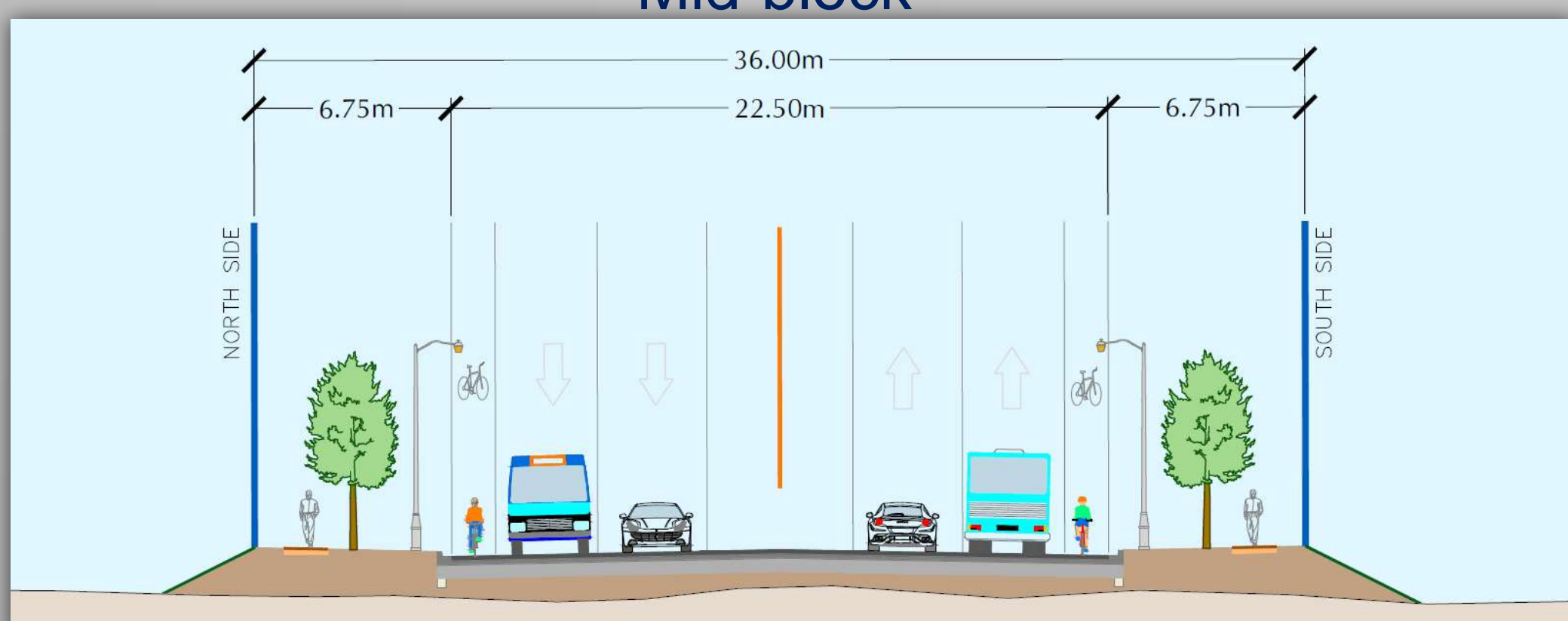
Intersection with Auxiliary lanes



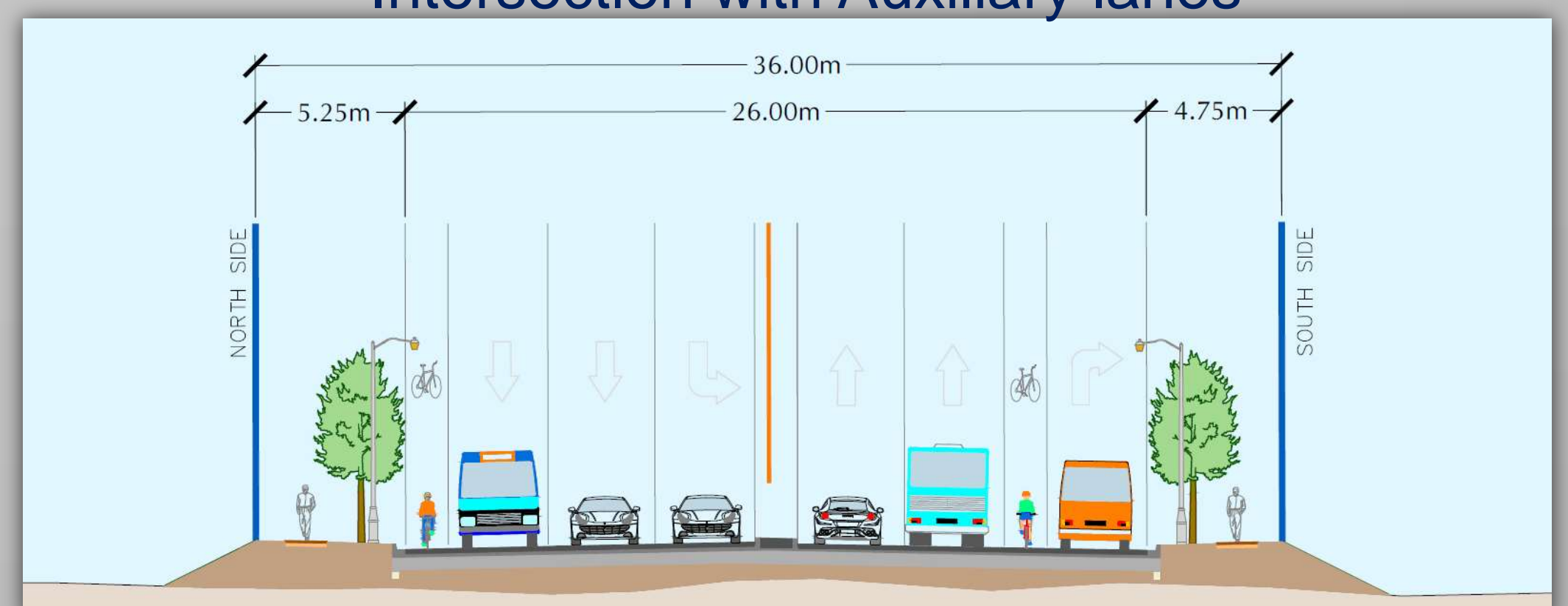
Option 4

- 5 lane cross section
- Continuous shared left + right turn lane
- Sidewalks + dedicated bike lanes
- 22.5m pavement on 36m right-of-way

Mid-block



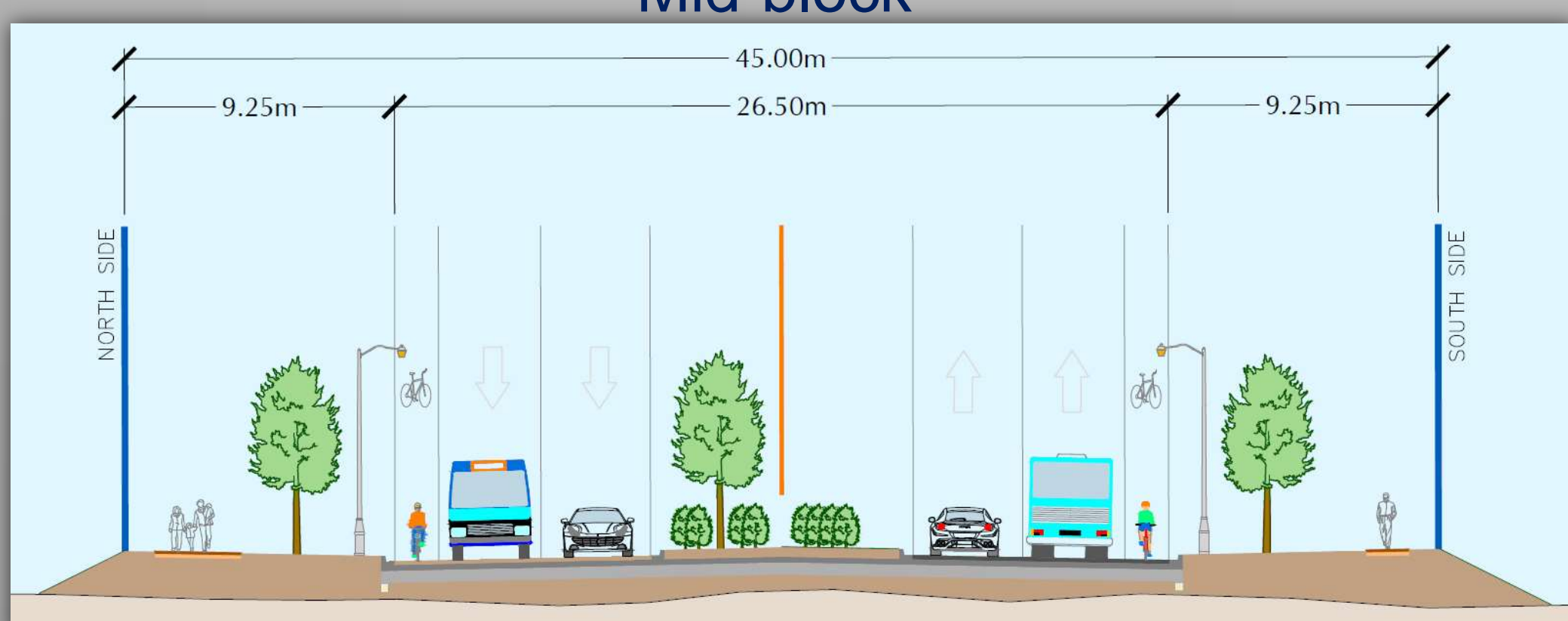
Intersection with Auxiliary lanes



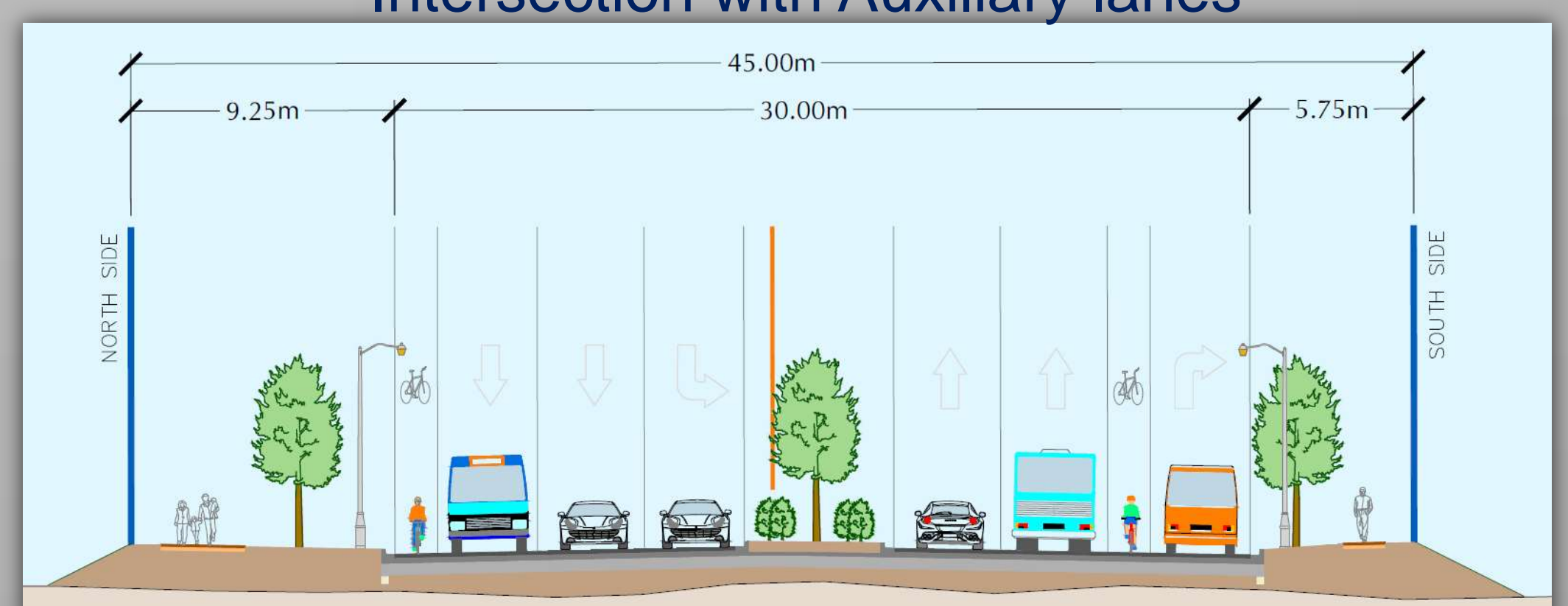
Option 5

- 4 lane cross section with green refuge strip
- Auxiliary lanes where required
- Sidewalk + multi-use trail + dedicated bike lanes
- 17.5m pavement + 9m center strip on 45m right-of-way

Mid-block



Intersection with Auxiliary lanes



Natural Environment Evaluation Alternative Road Cross-sections

Evaluation Criteria	Indicators	Alternative Road Cross-sections					
		1	2	3	4	5	
Terrestrial Features Aspect							
Wetlands	➤ Effects on Provincially Significant Wetland and other wetlands	Symbol					
		Score	5	4	2	1	3
Vegetation	➤ Encroachment on Designated Environmentally Sensitive Areas / Areas of Natural and Scientific Interest ➤ Effects on Significant Terrestrial Features (encroachment, reduction of area) ➤ Fragmentation/Connectivity of features ➤ Species at Risk (rare, endangered and threatened) ➤ Opportunities for enhancement	Symbol					
		Score	5	4	2	1	3
Wildlife Habitat	➤ Effects on Significant Wildlife Habitat (encroachment, reduction of area) ➤ Fragmentation/Connectivity of features ➤ Species at Risk (rare, endangered and threatened) ➤ Opportunities for enhancement	Symbol					
		Score	5	5	5	5	1
Aquatic Features Aspect							
Surface Water Quantity and Quality	➤ Degree of interference with water quality, thermal regime or baseflow	Symbol					
		Score	5	4	2	1	3
Aquatic Habitat	➤ Effects on extent (area) and function of riparian habitat	Symbol					
		Score	5	5	5	5	1
Surface Drainage Aspect							
Watercourses	➤ Requirements for crossing of East Patterson Creek (reduction of area)	Symbol					
		Score	5	5	5	5	1
Stormwater Management	➤ Effects on catchment area ➤ Operation and maintenance requirements	Symbol					
		Score	5	4	3	2	1
Groundwater Aspect							
Recharge Areas	➤ Degree of interference with groundwater recharge/discharge areas	Symbol					
		Score	5	5	5	5	5
Groundwater Quality	➤ Effects on vulnerable areas	Symbol					
		Score	5	5	5	5	5
Natural Environment Ranking		Symbol					
	Average Score		5.00	4.56	3.78	3.33	2.56

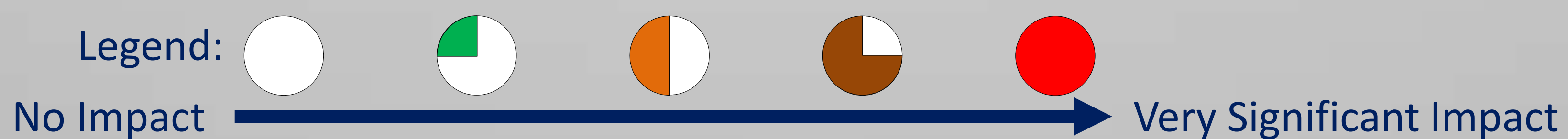
Legend:

No Impact Very Significant Impact

- ❑ Option 1 has the least amount of impact to the wetlands, woodlands/wildlife habitat and surface water quality as it has the least amount of impervious pavement and is the preferred ROW width of 36m.
- ❑ Option 5 will result in the most impacts to adjacent woodlands/wildlife habitat and wetland due to the wider road ROW width of 45 m.
- ❑ All Options affect the watercourses equally except for Option 5 which will have greater impacts due to the wider road ROW width of 45 m.
- ❑ Option 1 will result in the least amount of impact to stormwater management whereas Option 5 will result in the most.
- ❑ Option 1 is ranked the highest as it will result in the least amount of encroachment into adjacent natural heritage features (36 m) and has the least amount of impervious surface area (pavement).
- ❑ Option 5 is ranked the lowest as it will result in the greatest amount of encroachment into adjacent natural heritage features (45 m).

Transportation Environment Evaluation Alternative Road Cross-sections

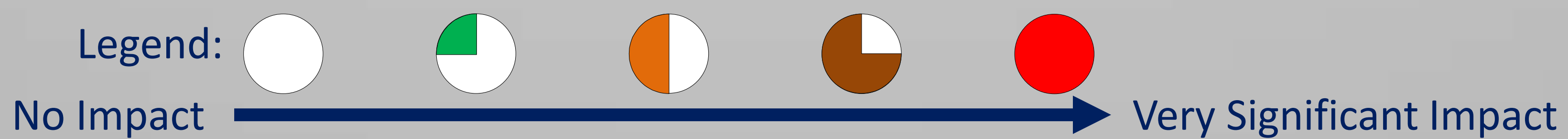
Evaluation Criteria	Indicators	Alternative Road Cross-sections					
		1	2	3	4	5	
<i>Planning Aspect</i>							
Network Connectivity	<ul style="list-style-type: none"> Improvement in Network Connectivity Capability to support regulatory framework, including municipal and regional plans, policy initiatives, standards and guidelines 	Symbol					
		Score	5	5	5	5	5
Network Capacity	<ul style="list-style-type: none"> Improvement in Future Congestion (meeting of projected travel demands) Improvement in Traffic Operations for commuters, local businesses (reduced congestion) 	Symbol					
		Score	5	4	3	3	3
<i>Engineering Aspect</i>							
Mode of Transportation	<ul style="list-style-type: none"> Ability to accommodate Transit, Cycling, Pedestrian, Vehicular modes 	Symbol					
		Score	5	3	5	3	3
Design Complexity	<ul style="list-style-type: none"> Use of substandard design components (i.e. horizontal/vertical curves) Improvement in roadway geometry 	Symbol					
		Score	5	4	3	2	1
Construction Complexity	<ul style="list-style-type: none"> Constructability (structural requirements, retaining walls, earth balance, watercourse/wetland crossing) Construction staging challenges Geotechnical challenges (soil/ground conditions) 	Symbol					
		Score	5	4	3	2	1
Operation	<ul style="list-style-type: none"> Improvement in road safety and accessibility (sight distance; turning movements) 	Symbol					
		Score	5	4	3	2	1
Transportation Environment Ranking	Symbol						
	Average Score	5.00	4.00	3.67	2.83	2.33	



- ❑ No development is expected north of the Kirby Road Extension. Therefore, a continuous center left turn lane is not needed from an operations perspective.
- ❑ The minimal 4 lane mid-block cross-section can be strategically modified to incorporate westbound exclusive left turn lanes at Future Urban Zone intersections.
- ❑ Option 5 is ranked the lowest as it creates significant overall environmental effects, exhibits the highest level of design and construction complexity and the highest operation requirements.
- ❑ Option 1 is the most efficient cross-section that improves connectivity, meets all forecast modal demands, provides a maximum level of service to each mode of transportation, and exhibits the least design and construction complexity.
- ❑ Option 1 is ranked the highest as it creates the least environmental effects compared to other options.

Social Environment Evaluation Alternative Road Cross-sections

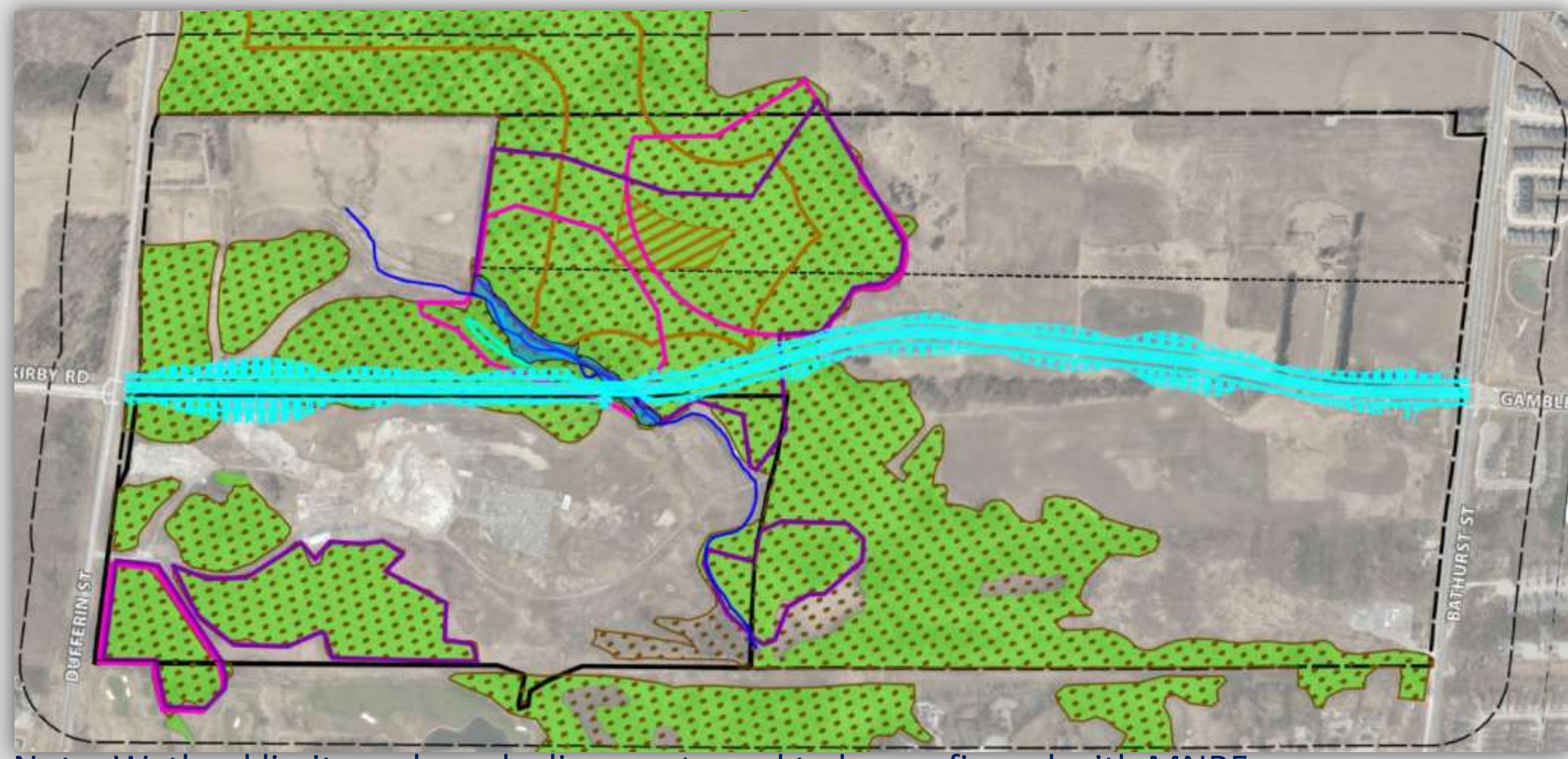
Evaluation Criteria	Indicators	Alternative Road Cross-sections					
		1	2	3	4	5	
<i>Land Use Aspect</i>							
Resource Designations and Policies	➤ Degree of compatibility with provincial, regional and municipal growth/development goals/objectives	Symbol					
		Score	5	5	5	5	1
Agricultural Operations	➤ Physical resource consumption ➤ Facility resource consumption ➤ Operational impacts	Symbol					
		Score	5	5	5	5	1
Approved Development Proposals	➤ Accommodating existing/future development proposals (public access/intersecting streets/connections for all modes of transportation)	Symbol					
		Score	5	5	5	5	1
<i>Community Aspect</i>							
Quality of Life	➤ Encroachment on individual properties (number/area) ➤ Improvement in traffic operations for commuters and active transportation	Symbol					
		Score	5	5	5	5	1
Existing Wells	➤ Effects on water quality and quantity ➤ Number of affected wells	Symbol					
		Score	5	5	5	5	5
Noise	➤ Change in sound levels over pre-existing conditions	Symbol					
		Score	5	5	5	5	5
<i>Cultural Aspect</i>							
Archaeological Resources	➤ Degree of interference with known areas of archaeological potential	Symbol					
		Score	2	2	2	2	1
Built Heritage Resources	➤ Degree of interference with cultural heritage features	Symbol					
		Score	2	2	2	2	1
Social Environment Ranking		Symbol					
	Average Score		4.25	4.25	4.25	4.25	2.00



- Options 1 - 4 propose a road allowance width of 36 m.
- Option 5 proposes a road allowance width of 45 m.
- The social effects of Option 1 – 4 do not differ amongst these options.
- The social effect of Option 5 is greater than Options 1 - 4 due to its larger footprint, which results in a greater impact on existing environmental features, agricultural operations, approved development proposals and the amount of private land that must be acquired.
- Options 1 - 4 are ranked equally and Option 5 is ranked the lowest as it requires more Stage 2 archaeological survey, includes the widest grading limit and poses very significant impacts to the identified cultural farmscape.

Natural Environment Impact Assessment Alternative Road Alignments

Alignment 4 Minor Northerly Diversion

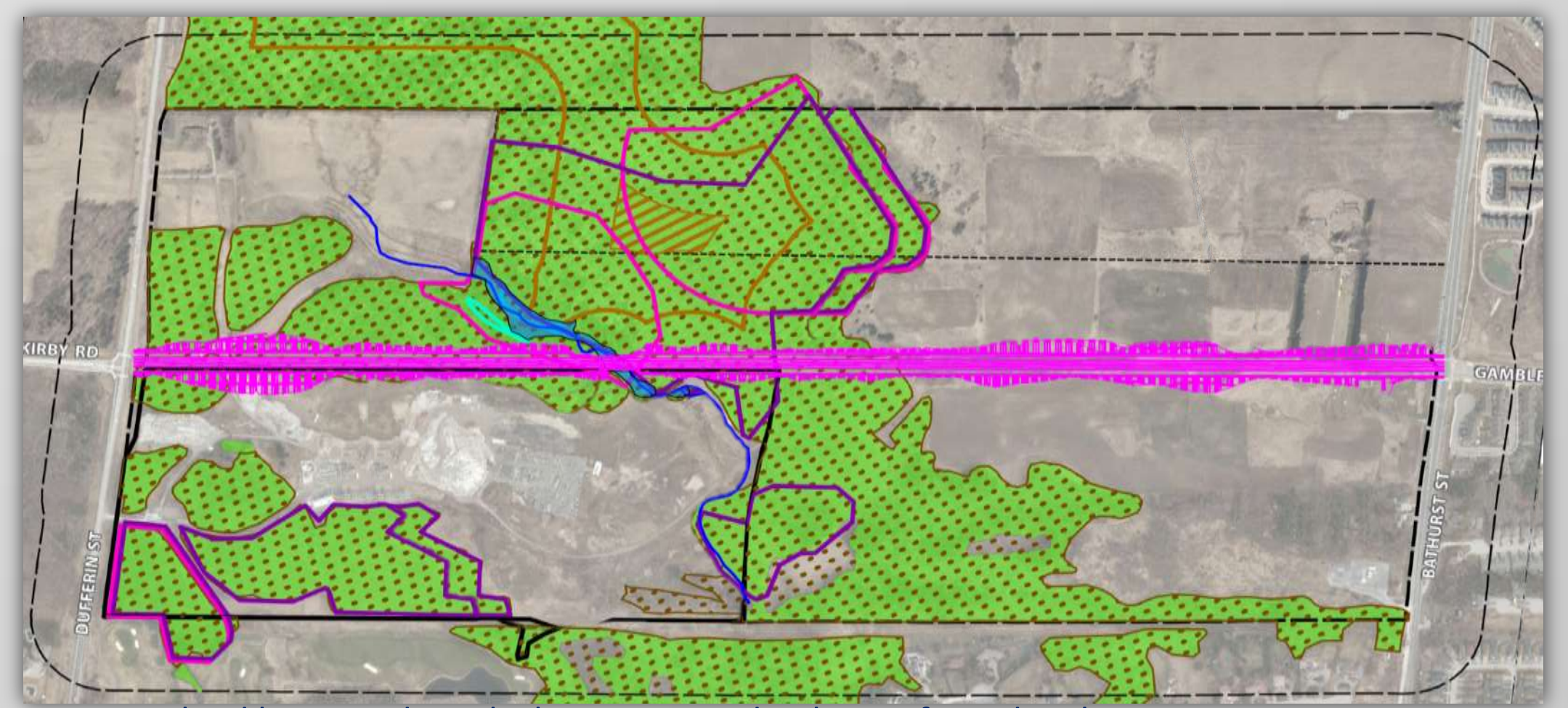


Note: Wetland limits and creek alignment need to be confirmed with MNRF

- ❑ Significant impact to PSW and riparian area – direct removal of riparian wetland vegetation.
- ❑ Significant impact to and direct removal of woodlands which provide Significant Wildlife Habitat (SWH) for Species of Conservation Concern and bats – 5.62 ha along 933 m of alignment.
- ❑ Moderate impact to habitat for Species at Risk.
- ❑ Moderate impact to East Patterson Creek.

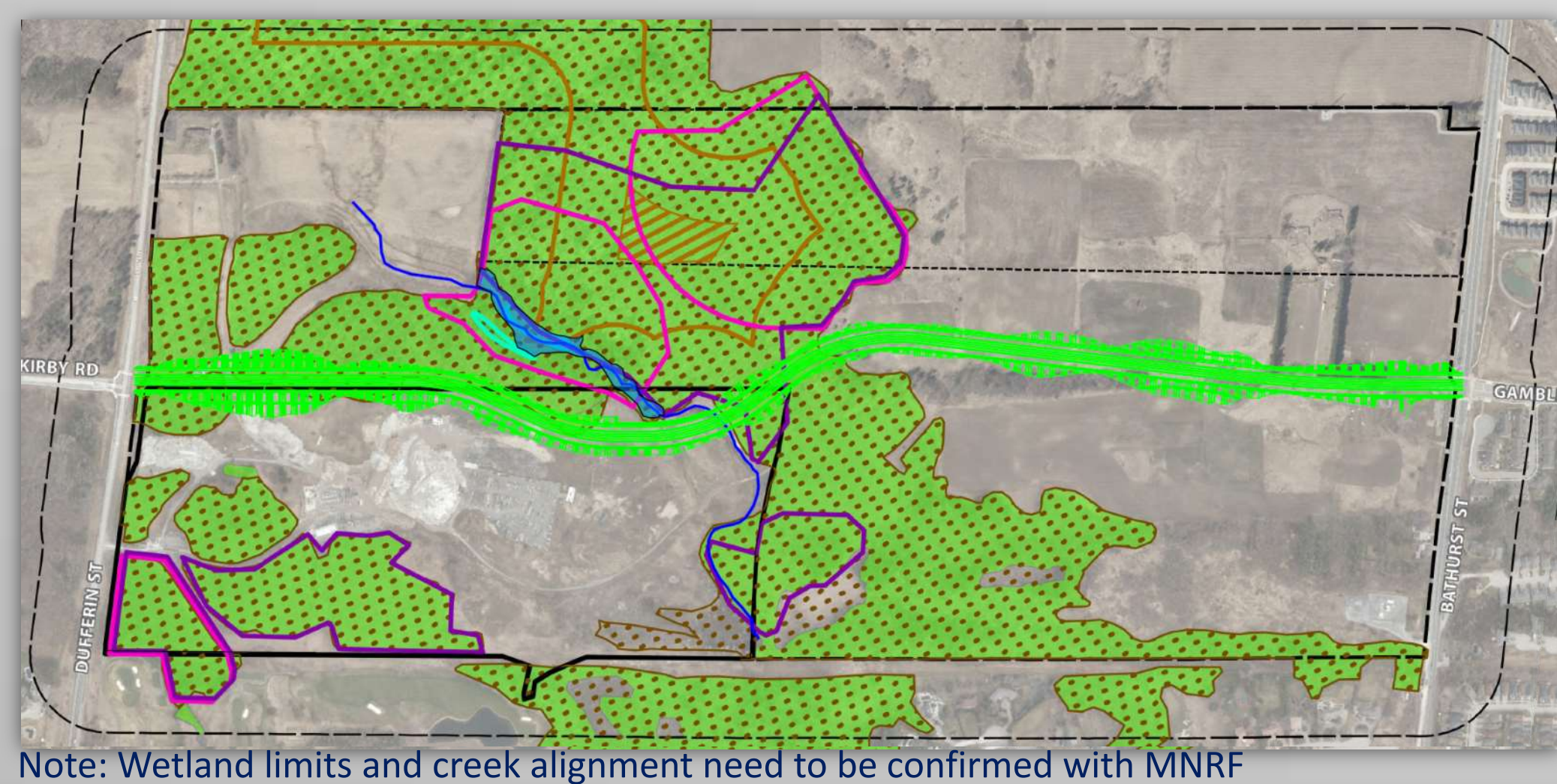
Alignment 5 Direct Route Extension

- ❑ Significant impact to PSW and riparian area – direct removal of riparian wetland vegetation.
- ❑ Most significant impact to and direct removal of woodlands which provide Significant Wildlife Habitat (SWH) for Species of Conservation Concern and bats – 7.13 ha along 1069 m of alignment.
- ❑ Significant impact to habitat for Species at Risk.
- ❑ Moderate impact to East Patterson Creek.



Note: Wetland limits and creek alignment need to be confirmed with MNRF

Alignment 6 South and North Minor Jog Diversion

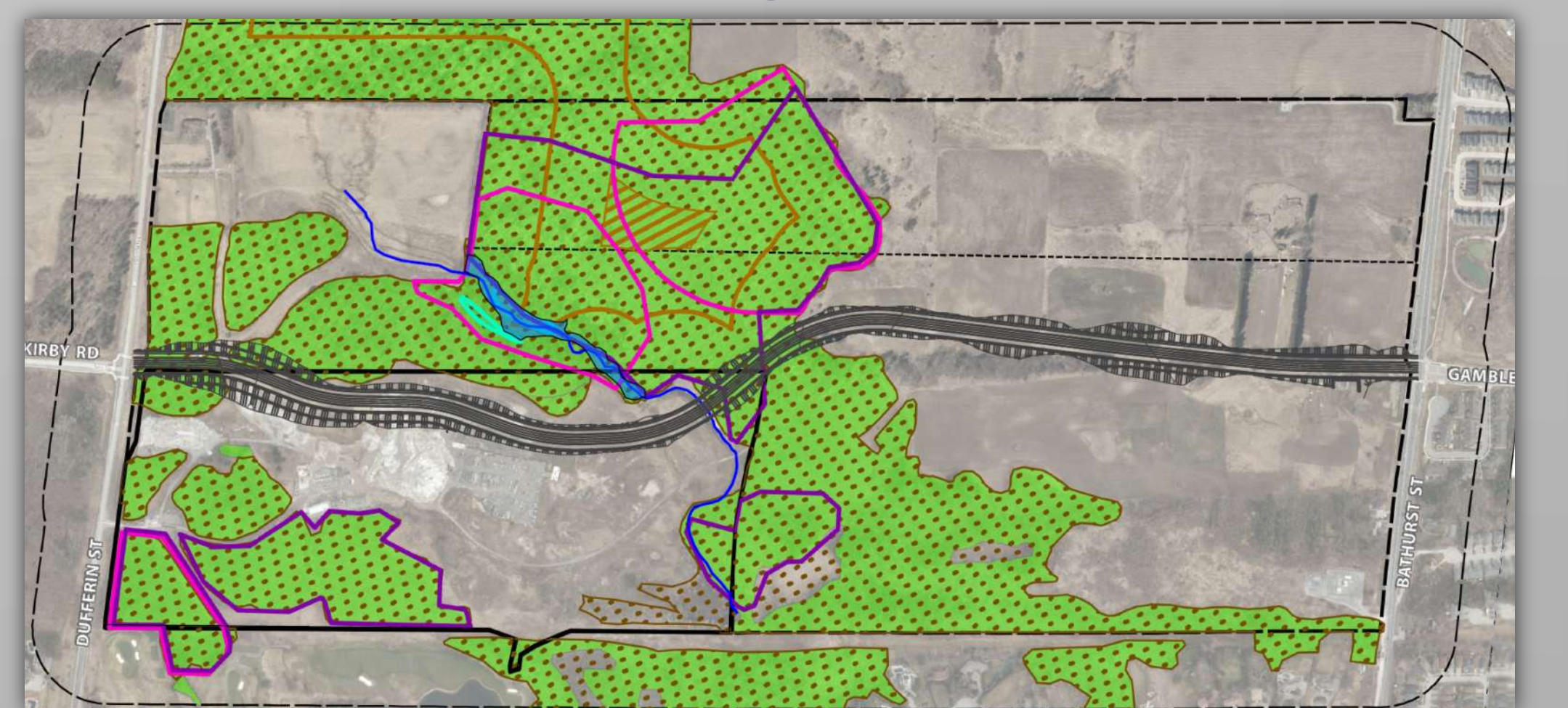


Note: Wetland limits and creek alignment need to be confirmed with MNRF

- ❑ Moderate impact to PSW and riparian area – direct removal of riparian wetland vegetation.
- ❑ Minimal impact to and direct removal of woodlands (primarily edge effect) which provide Significant Wildlife Habitat (SWH) for Species of Conservation Concern and bats – 4.63 ha along 661 m of alignment.
- ❑ Moderate impact to habitat for Species at Risk.
- ❑ Minimal impact to East Patterson Creek.

Alignment 6A Modified South and North Minor Jog Diversion

- ❑ Minimal impact to PSW and wetland riparian area – no direct removal of riparian vegetation.
- ❑ Least impact to woodlands which provide Significant Wildlife Habitat (SWH) for Species of Conservation Concern and bats – least amount of removal, 3.83 ha along 274 m of alignment.
- ❑ Moderate impact to habitat for Species at Risk.
- ❑ Minimal impact to East Patterson Creek.



Note: Wetland limits and creek alignment need to be confirmed with MNRF

Legend:

- Future Urban Area Zone
- - Subject Lands/Study Area
- 120m Adjacent Lands
- Significant Woodland (as Determined Through ORM Technical Paper 7)
- Interior Woodland 200 m

- Interior Woodland 100 m
- Bats Maternity Colonies SWH
- Seeps and Springs
- Eastern Wood-Pewee (Special Concern) SWH
- Wood Thrush (Special Concern) SWH

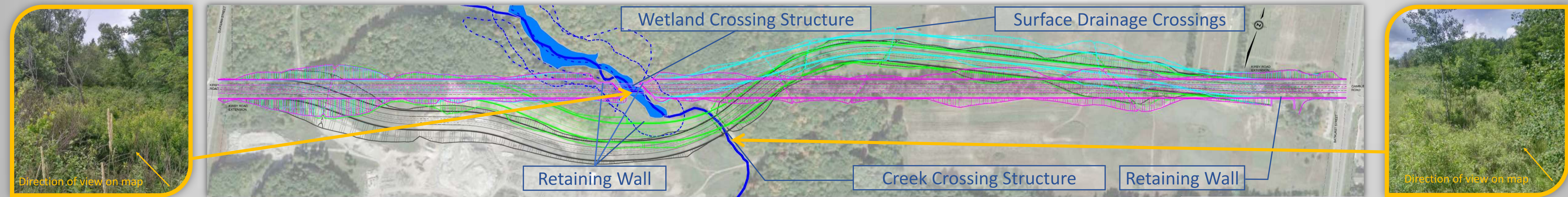
Natural Environment Evaluation Alternative Road Alignments

Evaluation Criteria	Indicators	Alternative Road Alignments				
		4	5	6	6A	
<i>Terrestrial Features Aspect</i>						
Wetlands	➤ Effects on Provincially Significant Wetland and other wetlands	Symbol				
		Score	2	2	3	4
Vegetation	➤ Encroachment on Designated Environmentally Sensitive Areas / Areas of Natural and Scientific Interest ➤ Effects on Significant Terrestrial Features (encroachment, reduction of area) ➤ Fragmentation/Connectivity of features ➤ Species at Risk (rare, endangered and threatened) ➤ Opportunities for enhancement	Symbol				
		Score	2	1	3	4
Wildlife Habitat	➤ Effects on Significant Wildlife Habitat (encroachment, reduction of area) ➤ Fragmentation/Connectivity of features ➤ Species at Risk (rare, endangered and threatened) ➤ Opportunities for enhancement	Symbol				
		Score	2	1	3	3
<i>Aquatic Features Aspect</i>						
Surface Water Quantity and Quality	➤ Degree of interference with water quality, thermal regime or baseflow	Symbol				
		Score	3	3	4	4
Aquatic Habitat	➤ Effects on extent (area) and function of riparian habitat	Symbol				
		Score	5	5	4	4
<i>Surface Drainage Aspect</i>						
Watercourses	➤ Requirements for crossing of East Patterson Creek (reduction of area)	Symbol				
		Score	3	3	4	4
Stormwater Management	➤ Effects on catchment area ➤ Operation and maintenance requirements	Symbol				
		Score	4	5	3	3
<i>Groundwater Aspect</i>						
Recharge Areas	➤ Degree of interference with groundwater recharge/discharge areas	Symbol				
		Score	3	3	4	4
Groundwater Quality	➤ Effects on vulnerable areas	Symbol				
		Score	5	5	5	5
Natural Environment Ranking	Symbol					
	Average Score	3.22	3.11	3.67	3.89	

Legend:
 No Impact Very Significant Impact

- Alignment 5 will result in the most amount of impact to woodlands and wildlife habitat and a moderate impact to the wetland whereas alignment 6A will result in the least amount of impact to these features and a minimal impact to the wetland.
- Alignments 4 and 5 will result in similar (moderate) impacts to surface water quantity and quality and no effects to aquatic habitat and Alignments 6 and 6A will result in less impacts to surface water quantity and quality and minimal effects to aquatic habitat.
- Alignments 4 and 5 will result in moderate impacts to the watercourse and recharge/discharge areas and minimal impacts to stormwater management.
- Alignments 6 and 6A will result in the least amount of impact to the watercourse and recharge/discharge areas and moderate impacts to stormwater management.
- No impact to groundwater quality is anticipated with all of the proposed alignments.
- Alignment 5 is ranked the lowest as it will result in the greatest amount of removal of woodlands and encroaches within PSW riparian areas.
- Alignment 6A is ranked the highest as it avoids most woodlands, the PSW and associated riparian area.

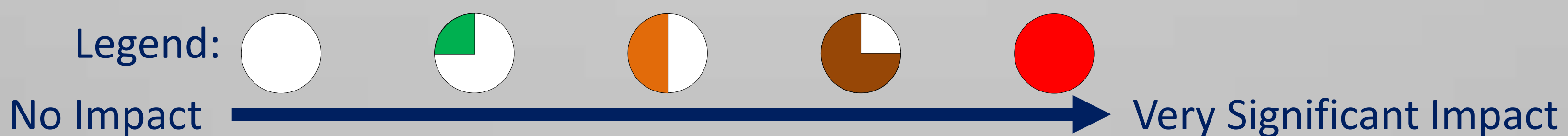
Transportation Impact Assessment - Alternative Road Alignments



Applicable Alignments	Common Effects	Alignment Characteristics	Alignment Specific Effects
All Alignments	<ul style="list-style-type: none"> ❑ Improve connectivity and overall network capacity. ❑ Provide options for travel and encourage transit and active transportation. 	<p>Alignment 4 Minor Northerly Diversion</p> <ul style="list-style-type: none"> ❑ Approximately 50 m wetland crossing structure ❑ Five surface drainage crossings ❑ Retaining walls: 770 square meters ❑ Footprint: 11.21 ha 	<ul style="list-style-type: none"> ❑ Less complex design due to minimal curvature requiring fewer super-elevated sections. ❑ Small earthwork quantity and environmental footprint.
Alignment 4 & Alignment 5	<ul style="list-style-type: none"> ❑ Subsurface conditions in the wetland area could be a challenge for wetland crossing structure based on preliminary geotechnical investigation. ❑ Use of standard design pavement cross-section allows to keep ice/water clear from the center/main travel lane and ensure traffic safety. ❑ Retaining walls at wetland crossing and cultural heritage site require additional inspection and maintenance. ❑ Wetland crossing structure requires increased level of design and construction complexity, and higher level of inspection and maintenance. 	<p>Alignment 5 Direct Route Extension</p> <ul style="list-style-type: none"> ❑ Approximately 50 m wetland crossing structure ❑ Four surface drainage crossings ❑ Retaining walls: 770 square meters ❑ Footprint: 11.14 ha 	<ul style="list-style-type: none"> ❑ Least complex design without horizontal curvature does not require super-elevated sections. ❑ Smallest earthwork quantity and environmental footprint. ❑ Minimal number of surface drainage crossings (four total) due to least number of depressions based on existing ground elevation.
Alignment 6 & Alignment 6A	<ul style="list-style-type: none"> ❑ Curvature increases travel time and results in increased operating cost for transit; longer walking distance for pedestrians. ❑ Increased challenge for traffic safety due to number of curvatures and transition segments between curves (horizontal and vertical) including safe distance for curve and super-elevation transition. ❑ High groundwater may be encountered at creek crossing location based on preliminary geotechnical investigation. ❑ Creek crossing structure requires slightly higher design complexity, level of inspection and maintenance. ❑ Super elevated pavement causes black ice on center travel lanes which may impact traffic safety. ❑ The curvature slightly reduces sight visibility. 	<p>Alignment 6 South and North Minor Jog Diversion</p> <ul style="list-style-type: none"> ❑ Approximately 12 m wide creek crossing structure based on preliminary geomorphics ❑ Five surface drainage crossings ❑ Retaining walls: 943 square meters ❑ Footprint: 12.00 ha 	<ul style="list-style-type: none"> ❑ Larger earthwork quantity, greater grading requirements and environmental footprint. ❑ Large section of retaining wall increases complexity, level of inspection, and maintenance.
		<p>Alignment 6A Modified South and North Minor Jog Diversion</p> <ul style="list-style-type: none"> ❑ Approximately 12 m wide creek crossing structure based on preliminary geomorphics ❑ Five surface drainage crossings ❑ Retaining walls: 315 square meters ❑ Footprint: 12.05 ha 	<ul style="list-style-type: none"> ❑ Largest earthwork quantity, greatest grading requirements and environmental footprint. ❑ Some section of retaining wall slightly increases complexity, level of inspection, and maintenance.

Transportation Environment Evaluation Alternative Road Alignments

Evaluation Criteria	Indicators	Alternative Road Alignments				
		4	5	6	6A	
<i>Planning Aspect</i>						
Network Connectivity	<ul style="list-style-type: none"> Improvement in Network Connectivity Capability to support regulatory framework, including municipal and regional plans, policy initiatives, standards and guidelines 	Symbol				
		Score	5	5	5	5
Network Capacity	<ul style="list-style-type: none"> Improvement in Future Congestion (meeting of projected travel demands) Improvement in Traffic Operations for commuters, local businesses (reduced congestion) 	Symbol				
		Score	5	5	5	5
<i>Engineering Aspect</i>						
Mode of Transportation	<ul style="list-style-type: none"> Ability to accommodate Transit, Cycling, Pedestrian, Vehicular modes 	Symbol				
		Score	5	5	3	3
Design Complexity	<ul style="list-style-type: none"> Use of substandard design components (i.e. horizontal/vertical curves) Improvement in roadway geometry 	Symbol				
		Score	3	4	3	3
Construction Complexity	<ul style="list-style-type: none"> Constructability (structural requirements, retaining walls, earth balance, watercourse/wetland crossing) Construction staging challenges Geotechnical challenges (soil/ground conditions) 	Symbol				
		Score	3	4	3	3
Operation	<ul style="list-style-type: none"> Improvement in road safety and accessibility (sight distance; turning movements) 	Symbol				
		Score	4	4	2	3
Transportation Environment Ranking	Symbol					
	Average Score		4.17	4.50	3.50	3.67



- All alignments improve the overall road network operational capability.
- Alignment 6 and Alignment 6A introduce a varying center line curvature including the formation of back to back curves in order to connect to required north south arterial road intersections. Although network capacity is not directly affected, operating differences will occur.
- The introduction of curves in Alignments 6 and 6A lengthens the total travel distance for all modes of transportation between Bathurst Street and Dufferin Street. Transit will experience increased travel times and increased operating costs due to additional travel distance. Similarly, pedestrians and bicyclists will take longer to traverse the alignment. Automobiles and trucks again due to the increased travel distance will take a bit longer travel time and experience increased fuel consumption.
- Alignment 5 is ranked the highest as it exhibits no or minimal effects with regards to the evaluation criteria. Alignments 6 and 6A are ranked the second lowest and the lowest as they exhibit moderate or significant effects with respect to the Engineering Aspect.

Social Environment Impact Assessment Alternative Road Alignments

Alignment 4 Minor Northerly Diversion



Note: Wetland limits and creek alignment need to be confirmed with MNRF

- ❑ Requires an approximately 50m structure for PSW crossing resulting in a moderate impact on PSW.
- ❑ Affects approximately 5.62 ha of Core forested lands.
- ❑ Establishes a new forest edge in the western portion of the Study Area, but avoids hedgerow in the eastern portion.
- ❑ Significant Impact on agricultural lands with loss of approximately 4.07 ha and creates an unusable remnant parcel of approximately 0.91 ha.
- ❑ Requires acquisition of approximately 10.37 ha of privately owned lands.
- ❑ Has a minimal impact on future development proposals.

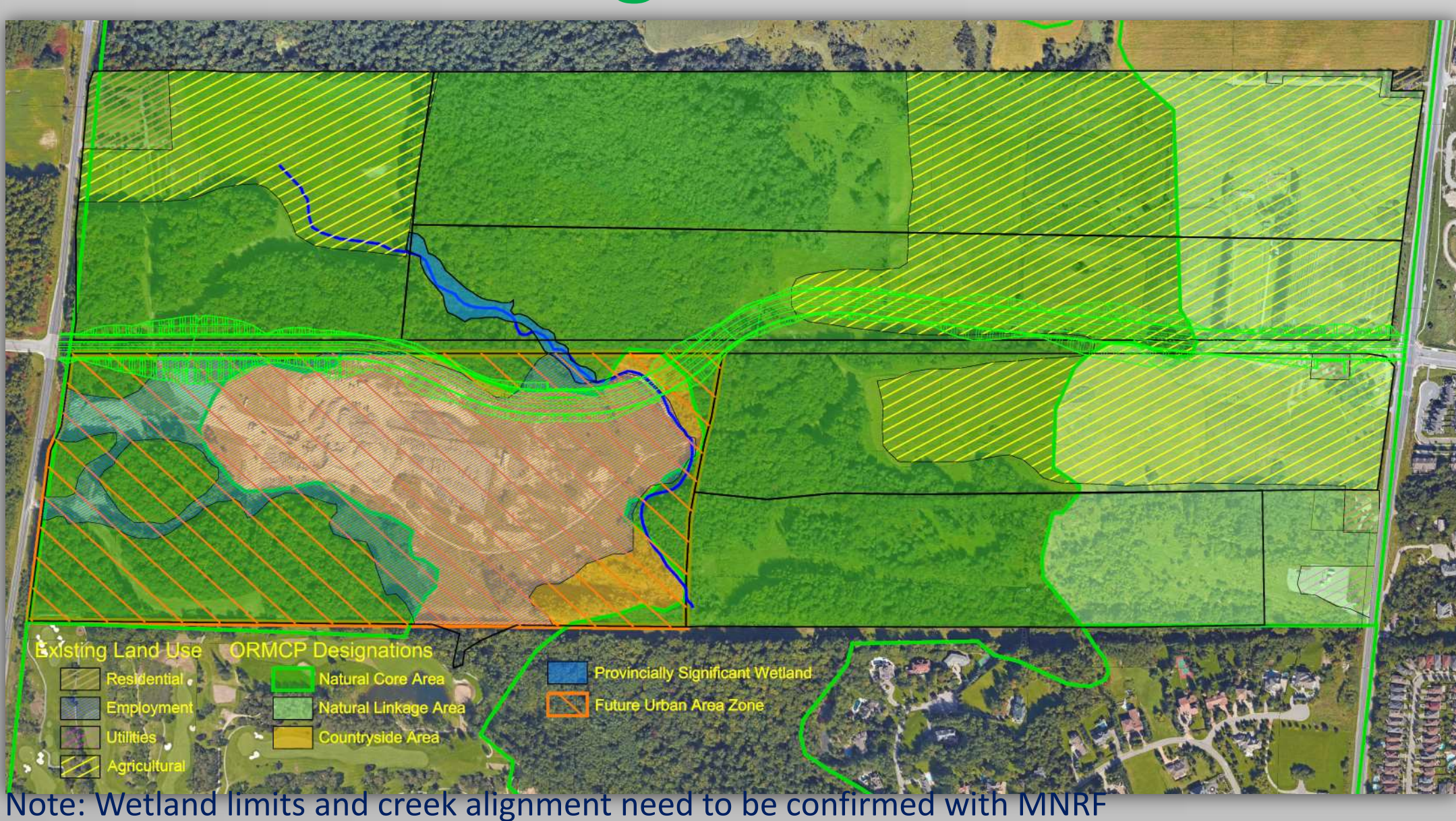
Alignment 5 Direct Route Extension

- ❑ Requires an approximately 50m structure for PSW crossing resulting in a moderate impact on PSW.
- ❑ Affects approximately 7.13 ha of Core forested lands.
- ❑ Establishes a new forest edge in the western portion of the Study Area, and removal of hedgerow in the eastern portion.
- ❑ Has the least impact on agricultural lands with loss of approximately 2.48 ha and does not create an unusable remnant parcel.
- ❑ Utilizes the existing ROW and requires acquisition of approximately 6.96 ha of privately owned lands.
- ❑ Has a minimal impact on future development proposals.



Note: Wetland limits and creek alignment need to be confirmed with MNRF

Alignment 6 South and North Minor Jog Diversion



Note: Wetland limits and creek alignment need to be confirmed with MNRF

- ❑ Avoids PSW.
- ❑ Affects approximately 4.63 ha of Core forested lands.
- ❑ Establishes a new forest edge in the western portion of the Study Area, but avoids hedgerow in the eastern portion.
- ❑ Significant Impact on agricultural lands with loss of approximately 4.04 ha and creates an unusable remnant parcel of approximately 0.11 ha.
- ❑ Utilizes less of the existing ROW requiring acquisition of approximately 11.35 ha of privately owned lands.
- ❑ Has a significant impact on future development proposals occupying approx. 2.83 ha of residentially designated lands and creation of an unusable parcel of approx. 0.38 ha.

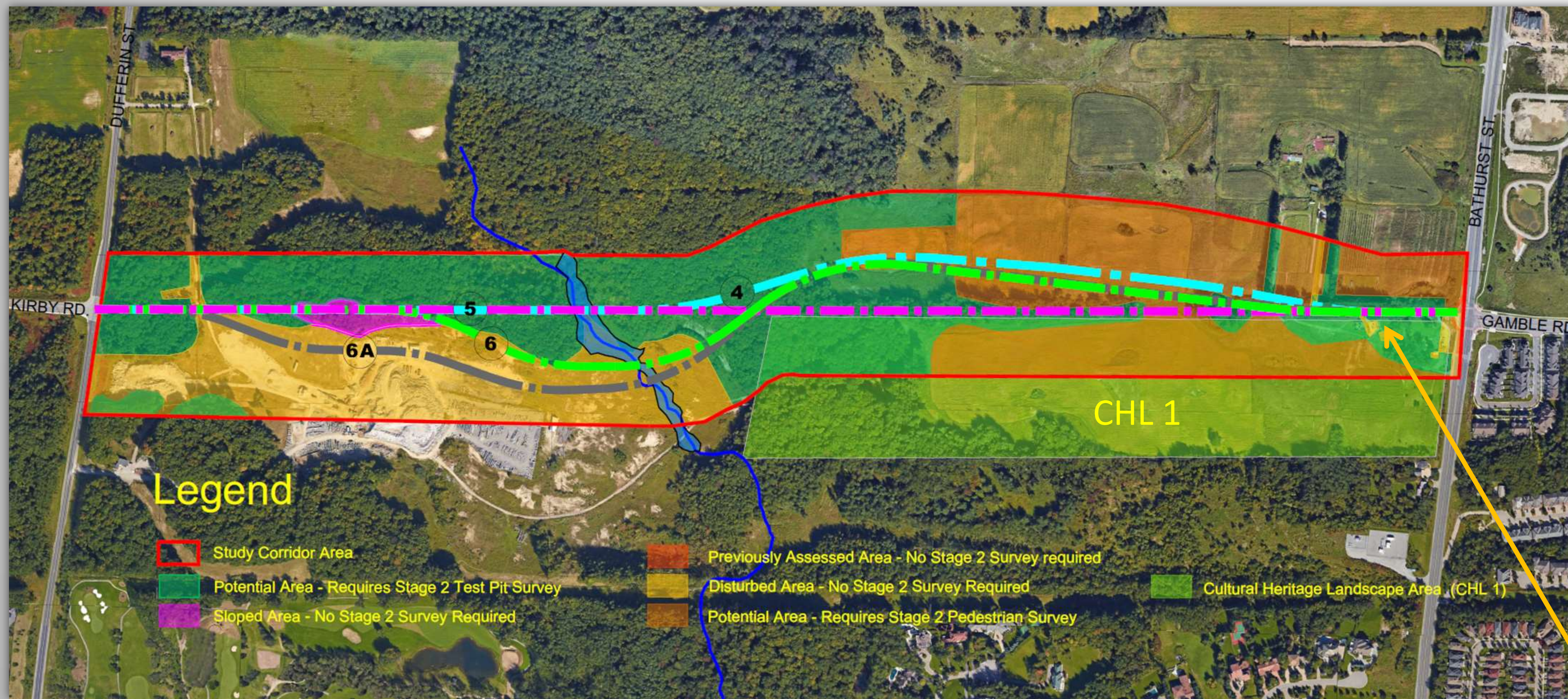
Alignment 6A Modified South and North Minor Jog Diversion

- ❑ Avoids PSW.
- ❑ Affects approximately 3.83 ha of Core forested lands.
- ❑ Reduces the creation of a new forest edge in the western portion of the Study Area, and avoids hedgerow in the eastern portion.
- ❑ Significant Impact on agricultural lands with loss of approximately 4.02 ha and creates an unusable remnant parcel of approximately 0.25 ha.
- ❑ Uses very little of the exiting ROW requiring acquisition of approximately 14.53 ha of privately owned lands.
- ❑ Has a very significant impact on future development proposals occupying approx. 4.21 ha of residentially designated lands and creation of an unusable parcel of approximately 1.98 ha.



Note: Wetland limits and creek alignment need to be confirmed with MNRF

Archeological and Cultural Heritage Impact Assessment Alternative Road Alignments



Archeological Effects

- ❑ All routes cross the areas of archaeological potential.
- ❑ Alignments 6 and 6A cross disturbed area which reduces potential for findings.
- ❑ Alignment 5 ranked the lowest as it exhibits highest potential for findings.
- ❑ Alignment 6A ranked the highest as it exhibits lowest potential for findings.

Property of Heritage Interest



Cultural Heritage Effects

- ❑ City of Vaughan has listed one property within the Study Area to be of cultural heritage interest, but it has not been officially identified.
- ❑ All alignments have an effect on the house which is mitigated by introduction of a retaining wall.
- ❑ Alignments 4, 6 and 6A avoid the Cultural Heritage Landscape of interest.
- ❑ Alignment 5 ranked lower than other alignments as it encroaches more into the Cultural Heritage Landscape than the other 3 alignments.

Social Environment Evaluation Alternative Road Alignments

Evaluation Criteria	Indicators	Alternative Road Alignments				
		4	5	6	6A	
<i>Land Use Aspect</i>						
Resource Designations and Policies	➤ Degree of compatibility with provincial, regional and municipal growth/development goals/objectives	Symbol				
		Score	3	2	4	4
Agricultural Operations	➤ Physical resource consumption ➤ Facility resource consumption ➤ Operational impacts	Symbol				
		Score	2	5	2	2
Approved Development Proposals	➤ Accommodating existing/future development proposals (public access/intersecting streets/connections for all modes of transportation)	Symbol				
		Score	5	5	2	1
<i>Community Aspect</i>						
Quality of Life	➤ Encroachment on individual properties (number/area) ➤ Improvement in traffic operations for commuters and active transportation	Symbol				
		Score	3	4	2	1
Existing Wells	➤ Effects on water quality and quantity ➤ Number of affected wells	Symbol				
		Score	5	5	5	5
Noise	➤ Change in sound levels over pre-existing conditions	Symbol				
		Score	5	5	5	5
<i>Cultural Aspect</i>						
Archaeological Resources	➤ Degree of interference with known areas of archaeological potential	Symbol				
		Score	1	1	2	3
Built Heritage Resources	➤ Degree of interference with cultural heritage features	Symbol				
		Score	3	2	3	3
Social Environment		Symbol				
Ranking		Average Score	3.38	3.63	3.13	3.00



No Impact Very Significant Impact

- Alignments 4 and 5 are the same except Alignment 4 avoids the hedgerow located in the existing ROW in the eastern portion of the Study Area and as a result, Alignment 4 has a significant impact on agricultural lands.
- Alignment 5, which uses all of the existing ROW has the least impact on existing and approved land uses and requires the acquisition of the least amount of privately owned lands.
- Alignments 6 and 6A have the least impact on existing environmental features and the greatest impact on existing and approved land uses
- Alignment 6 has a significant impact on privately owned lands requiring the acquisition of approximately 11.35 ha of land including approximately 3.21 ha of lands designated for residential development.
- Alignment 6A has a very significant impact on privately owned lands requiring the acquisition of approximately 14.53 ha of land including approximately 6.19 ha of lands designated for residential development.
- From a cultural perspective, Alignments 6 and 6A are preferred over Alignments 4 and 5 as they interfere to lesser degree with areas of known archaeological potential.
- Alignments 4, 6 and 6A would have moderate direct impacts on one previously identified cultural heritage resource of interest (11490 Bathurst St., farmhouse).
- Alignment 5 would have a more significant direct impact to one previously identified cultural heritage resource of interest (11490 Bathurst St., farmscape).
- Overall, Alignment 5 is ranked the highest and Alignment 6A is ranked the lowest.

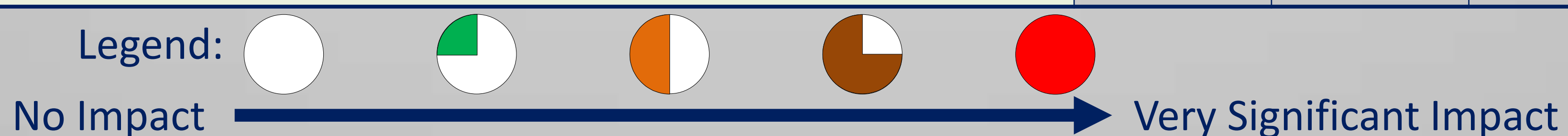
Economic Environment Evaluation

Cross-sections and Alignments

Evaluation Criteria	Indicators	Alternative Road Cross-sections					
		1	2	3	4	5	
Cost Estimates	➤ Capital Costs	Symbol					
		Score	4	4	3	2	1
	➤ Operation & Maintenance Costs	Symbol					
		Score	4	4	3	2	1
	➤ Property Acquisition Costs	Symbol					
		Score	3	3	3	3	1
Economic Environment Ranking	Symbol						
	Average Score	3.67	3.67	3.00	2.33	1.00	

- Options 1 and 2 are ranked the highest as they exhibit lowest construction, operation and maintenance costs.
- Option 5 is ranked the lowest as it exhibits the highest costs for construction, operation, maintenance and land acquisition.

Evaluation Criteria	Indicators	Alternative Road Alignments				
		4	5	6	6A	
Cost Estimates	➤ Capital Costs	Symbol				
		Score	3	3	4	4
	➤ Operation & Maintenance Costs	Symbol				
		Score	4	4	2	3
	➤ Property Acquisition Costs	Symbol				
		Score	4	5	3	1
Economic Environment Ranking	Symbol					
	Average Score	3.67	4.00	3.00	2.67	

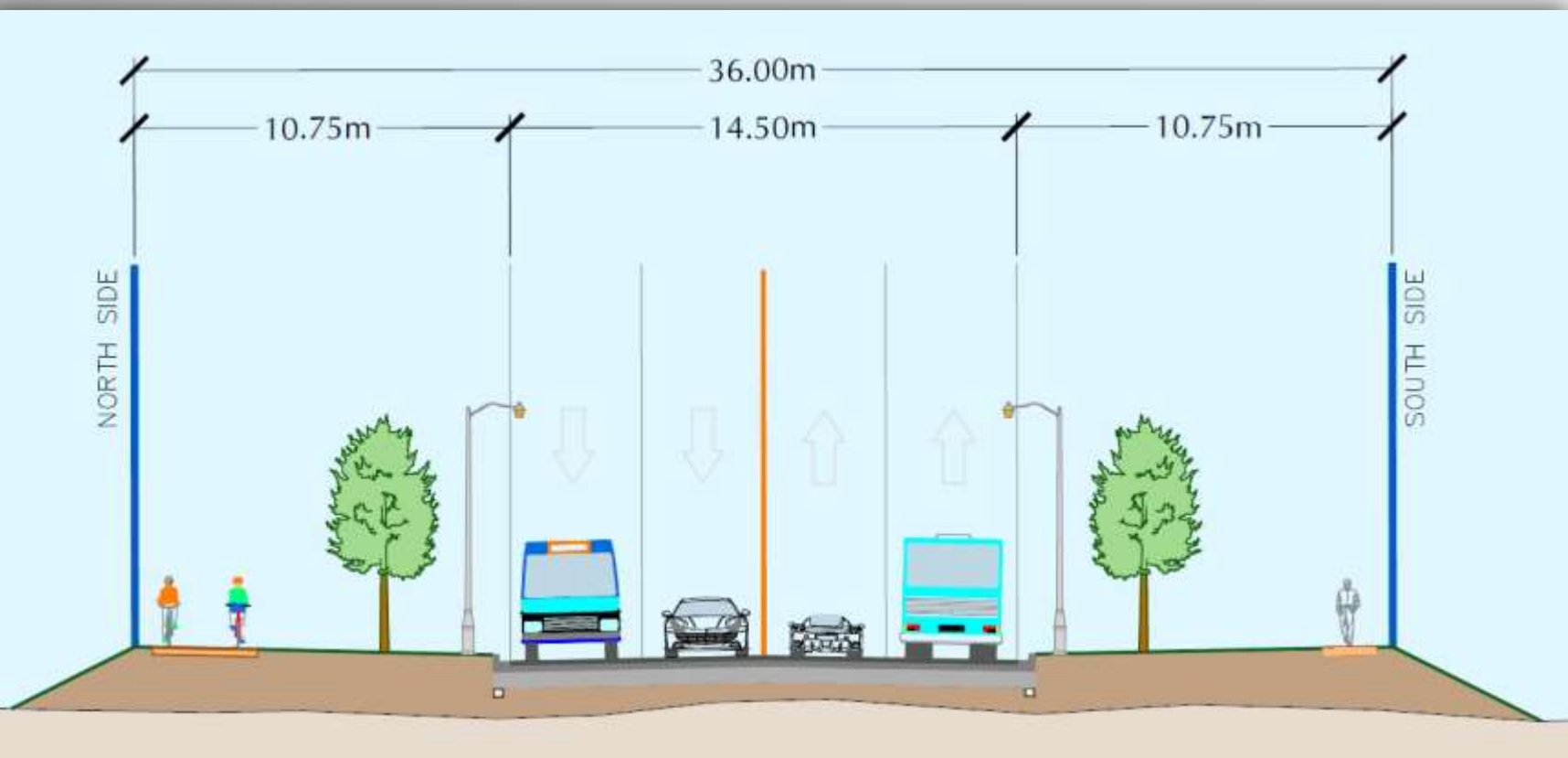


	Alignment 4	Alignment 5	Alignment 6	Alignment 6A
Item	Total	Total	Total	Total
Land Acquisition Totals	\$12.2 Million	\$11.6 Million	\$26.8 Million	\$50.7 Million
Capital Costs*	\$21.7 Million	\$20.4 Million	\$15.5 Million	\$15.7 Million
Grand Total	\$33.9 Million	\$32.0 Million	\$42.3 Million	\$66.4 Million

* Capital cost includes Engineering Fees, Site Preparation, Earthworks, Services, Roadworks, Structures, Miscellaneous, and Contingency costs.

- For the purpose of this evaluation, residentially designated lands were valued at \$8,030,640 per ha based on a development charges study for the City of Vaughan and non-residentially designated lands were valued at \$124,000 per ha based on property sales in the adjacent area.
- Alignment 4 utilizes the existing ROW in the western portion of the Study Area, requires the acquisition of agricultural land in the eastern portion, resulting in a slightly higher total land acquisition cost.
- Alignment 5 utilizes all the existing ROW, requires the least amount of land acquisition resulting in the lowest total land acquisition cost.
- Alignments 6 and 6A require the acquisition of residentially designated land and represent the more expensive options. Alignment 6A requires the most, resulting in a total land acquisition of over \$50 Million.
- Alignment 6A is overall ranked the lowest due to moderate relative operation and maintenance cost and the highest property acquisition costs.
- Alignment 5 is overall ranked the highest due to a moderate capital cost and the lowest property acquisition costs.

Evaluation Results – Alternative Road Cross-Sections



Example of similar Cross-section

Summary of Comparative Evaluation

Evaluation Criteria		Alternative Road Cross-sections				
		Option 1	Option 2	Option 3	Option 4	Option 5
Transportation Ranking	Symbol					
	Average Score	5.00	4.00	3.67	2.83	2.33
Natural Environment Ranking	Symbol					
	Average Score	5.00	4.56	3.78	3.33	2.56
Social Environment Ranking	Symbol					
	Average Score	4.25	4.25	4.25	4.25	2.00
Economic Environment Ranking	Symbol					
	Average Score	3.67	3.67	3.00	2.33	1.00
TOTAL SCORE (Sum of Factors)		17.92	16.47	14.69	12.75	7.89
RECOMMENDED?		Highly Recommended	Recommended	Less Recommended	Least Recommended	Not Recommended

Option 1 exhibits an efficient cross-section that improves connectivity, meets all forecast modal demands, provides a maximum level of service to each mode of transportation, and entails the least design and construction complexity.

The Project Team concluded that Option 1 should be carried forward as the Recommended Design Concept.

	Principal Advantages	Principal Disadvantages
1	<ul style="list-style-type: none"> Provides the highest level of service for bicyclists. Offers the greatest design flexibility in placement of utilities, street furniture and tree planting. Entails the least structural requirements, the least infrastructure for storm water management and the least width of pavement area. Exhibits the least potential runoff and erosion impacts to wetland and vegetation. Offers the lowest capital, operation and maintenance costs. 	<ul style="list-style-type: none"> Lacks dedicated bike lane continuity from Gamble Road.
2	<ul style="list-style-type: none"> Offers dedicated bike lane continuity from Gamble Road. Entails less structural requirements, less infrastructure for storm water management and less pavement area than Options 3 and 4. Offers the second lowest capital, operation and maintenance costs. 	<ul style="list-style-type: none"> Provides on road bike lane with a reduced level of service.
3	<ul style="list-style-type: none"> Provides the highest level of service for bicyclists. Entails a moderate pavement area with slightly more storm water management infrastructure. Exhibits a slight increase of potential runoff and erosion impacts compared to Options 1 and 2. 	<ul style="list-style-type: none"> Includes a continuous center left turn lane that is unlikely to be needed due to land formation. Lacks dedicated bike lane continuity from Gamble Road.
4	<ul style="list-style-type: none"> Offers dedicated bike lane continuity from Gamble Road. 	<ul style="list-style-type: none"> Provides on road bike lane with a reduced level of service. Includes a continuous center left turn lane that is unlikely to be needed due to land formation. Exhibits the widest pavement area and increase of potential runoff and erosion impacts compared to Options 1, 2 and 3.
5	<ul style="list-style-type: none"> Exceeds the requirements of the York and Vaughan TMAPs. Allows for "green" design. 	<ul style="list-style-type: none"> Entails the most complex non-standard design and structural requirements. Exhibits the highest capital, operation and maintenance costs. Exhibits the greatest potential for loss of edge/riparian habitat. Exhibits a significant impact on existing agricultural and residentially approved lands.

Evaluation Results – Alternative Road Alignments



Summary of Comparative Evaluation

Evaluation Criteria		Alternative Road Alignments			
		Alignment 4	Alignment 5	Alignment 6	Alignment 6A
Transportation Ranking	Symbol				
	Average Score	4.17	4.50	3.50	3.67
Natural Environment Ranking	Symbol				
	Average Score	3.22	3.11	3.67	3.89
Social Environment Ranking	Symbol				
	Average Score	3.38	3.63	3.13	3.00
Economic Environment Ranking	Symbol				
	Average Score	3.67	4.00	3.00	2.67
TOTAL SCORE (Sum of Factors)		14.43	15.24	13.29	13.22
RECOMMENDED?		Recommended	Highly Recommended	Least Recommended	Not Recommended

The Project Team concluded that Alignment 5 represents an acceptable balance of advantages and disadvantages across the range of evaluation criteria and should be carried forward as the Recommended Design Concept.

	Principal Advantages	Principal Disadvantages
4	<ul style="list-style-type: none"> <input type="checkbox"/> Less complex design and construction <input type="checkbox"/> Small earthwork quantity and grading footprint <input type="checkbox"/> Avoids hedgerow and cultural farmscape of interest <input type="checkbox"/> Minimal impact on future development 	<ul style="list-style-type: none"> <input type="checkbox"/> Significant impact to PSW riparian area due to 50m crossing structure <input type="checkbox"/> Significant impact to and direct removal of woodlands which provide Significant Wildlife Habitat Moderate impact to habitat for Species at Risk <input type="checkbox"/> Significant impact on agricultural lands <input type="checkbox"/> Moderate private land acquisition requirements
5	<ul style="list-style-type: none"> <input type="checkbox"/> Least complex design and construction <input type="checkbox"/> Smallest earthwork quantity and grading footprint <input type="checkbox"/> Least impact on agricultural lands <input type="checkbox"/> Minimal private land acquisition requirements <input type="checkbox"/> Minimal impact on future development 	<ul style="list-style-type: none"> <input type="checkbox"/> Significant impact to PSW riparian area due to 50m crossing structure <input type="checkbox"/> Significant impact to and direct removal of woodlands which provide Significant Wildlife Habitat Significant impact to habitat for Species at Risk <input type="checkbox"/> Highest potential for archaeological findings <input type="checkbox"/> Edge impacts to cultural farmscape of interest
6	<ul style="list-style-type: none"> <input type="checkbox"/> Minimal impact to woodlands which provide Significant Wildlife Habitat <input type="checkbox"/> Minimal impact to East Patterson Creek <input type="checkbox"/> Avoids hedgerow and cultural farmscape of interest 	<ul style="list-style-type: none"> <input type="checkbox"/> Moderate impact to PSW and riparian area <input type="checkbox"/> Moderate impact to habitat for Species at Risk <input type="checkbox"/> Complex design and construction <input type="checkbox"/> Large earthwork quantity and grading footprint. <input type="checkbox"/> Significant impact on agricultural lands. <input type="checkbox"/> Challenge for traffic safety due to high number of curves and transition segments between curves, increased possibility for black ice conditions. <input type="checkbox"/> Significant impact on future development proposals <input type="checkbox"/> High private land acquisition requirements
6A	<ul style="list-style-type: none"> <input type="checkbox"/> Minimal impact to PSW and riparian area <input type="checkbox"/> Minimal impact to woodlands which provide Significant Wildlife Habitat <input type="checkbox"/> Minimal impact to East Patterson Creek <input type="checkbox"/> Avoids hedgerow and cultural farmscape of interest <input type="checkbox"/> Lowest potential for archaeological findings 	<ul style="list-style-type: none"> <input type="checkbox"/> Most complex design and construction <input type="checkbox"/> Largest earthwork quantity and grading footprint. <input type="checkbox"/> Challenge for traffic safety due to highest number of curves and transition segments between curves, increased possibility for black ice conditions <input type="checkbox"/> Significant impact on agricultural lands. <input type="checkbox"/> Very significant impact on future development proposals <input type="checkbox"/> Highest private land acquisition requirements

What are the next steps?

PHASE 3B

Evaluation

- Collect and address comments
- Confirm Preferred Design Concept(s)

Having gained further input from all interested parties in reviewing the evaluation steps and arriving at the best decision, the Recommended Design Concept(s) will be confirmed as the Preferred Design Concept(s).

- Develop Project Description

Planned Studies:

- Wetland/watercourse Crossing Evaluation
- Floodplain Analysis
- Air Quality Impact Assessment
- Noise Impact Assessment
- Climate Change Impact Assessment

PHASE 3B

Consultation

TAG #3 and CLC #3 meetings to present Project Description are planned for late **September 2018**

PHASE 4

Environmental Study Report (ESR)

Submission to the MOECC and TRCA for review is planned for **mid Fall 2018** and to the City of Vaughan for **early Winter 2018**.

PHASE 4

Notice of Study Completion

Placement of ESR on public record for a 30 day mandatory public review is planned for **early Spring 2019**.

How can you help us?

- Please share your valuable input and fill the Response Form
- Response Forms can be returned to the project team members or sent by email / mail by **July 13, 2018** to:

Leonid Groysman, Class EA Lead,
Schaeffers Consulting Engineers,
6 Ronrose Drive, Concord, ON L4K 4R3

Phone: 905-738-6100 x 245

Fax : 905-738-6875

E-mail: KirbyRdEA@schaeffers.com

Any Questions ?

- Please talk with one of the members of the project team to address your issues/concerns
- More details about the study can also be found at:

<http://www.schaeffers.com/kirbyroadextension.asp>